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BIRDSEYE VIEW OF HAIWEE RESERVOIR.

Taken from an Elevation of 1,500 feet. In the Background is the Eastern Face of the Sierra Range. At the Left is the South Dam of the Reservoir, and Just at the Right of This Appears the Top of the Gate Tower. Shows the Absence of All Possible Sources of Pathogenic Bacteria.

SANITARY FEATURES OF LOS ANGELES AQUEDUCT

Drainage Area Remarkably Free of Inhabitants or Other Sources of Pollution—Storage of More Than Two Months In Haiwee Reservoir and Aqueduct Seems to Insure Removal of Any Pathogenic Bacteria.

By BURT A. HEINLY.†

Probably few cities of Europe or our own country are so favorably situated to ensure the necessary sanitary conditions and effect the delivery of a pure and potable domestic water supply without artificial treatment, as is the city of Los Angeles, Cal., in the possession of the Los Angeles aqueduct. A sparsely inhabited region as a drainage area, large reservoirs to provide storage and sterilization,* and the carrying of the water a long distance through concrete conduits and steel pipe lines, often under heavy pressure, with aeration by falls aggregating 1,600 feet in height—each provides a subject for interesting discussion.

Preceding articles in this journal have discussed the plans of construction of the works, so that it will be necessary here only to state that the streams flowing down the eastern face of the Sierra over a lineal distance

of 120 miles are collected and carried southward across the Mojave desert and through the crest of the Coast range to the rim of the San Fernando valley, a distance of 233 miles. Here the aqueduct terminates and the city trunk line, a system complete in itself excepting for its source of supply, carries the water across the San Fernando valley, through the crest of the Santa Monica range, down their southeastern flank and into the city, a distance of 25 miles.

The principal tributary of the aqueduct is the Owens river, which has its rise in the heart of the Sierra Nevada near Yosemite Park at an elevation of 11,000 feet. Within its upper drainage of 444 square miles, comprising the area of Long valley, the district is uninhabited excepting in the summer season by a few campers, and stockmen who seek the valley for its excellent pasturage. Flowing in an easterly direction for 20 miles through Round valley, it turns southerly into the northern end of Owens valley and, after a flow of 25 miles, enters the intake of the Los Angeles aqueduct, or, if the inlet gates

*The author uses the word "sterilization" in this article where he should, in our opinion, have used "disinfection." No public water supply is sterile.—Editor.

†Secretary to chief engineer, Bureau of Water Works and Supply, Los Angeles, Cal.

are closed, continues southward 35 miles to empty into alkaline Owens lake.

The flow of the Owens river, after entering the aqueduct, is increased by many small streams that debouch from their steep canyons to be intercepted by the municipal water course. The depression so drained has a total area of 2,782 square miles, comprising a long narrow valley hemmed in on the east and west by precipitous mountain ranges. The eastern range comprises the Inyos, which contribute little or nothing to the drainage as they are robbed of precipitation by the Sierra's interception of the moisture laden clouds coming from the Pacific ocean. This range therefore offers no inducement for habitation nor do the naked and precipitous Sierras on their higher slopes.

From the intake of the aqueduct to the first great impounding basin, the Haiwee reservoir, is a distance of 60.8 miles. The whole drainage basin to the north of this reservoir encompasses an area of 3,350 square miles. The whole population of the region, based on the last Federal census, is placed at the present time at 4,600. This gives an average density of population of only 1.4 per square mile. By a comparison of these figures with those of population on watersheds of water supply systems of other cities of the United States, the favorable conditions under which the aqueduct supply is collected will be the more apparent. Making only a few comparisons, the population on the drainage areas of the impounding reservoirs of Boston, Fall River, Worcester, Rochester, and Syracuse ranges from 21 to 210 times that of the Haiwee reservoir, and in no one of these citations is there any other purification than by storage. In the whole Owens valley there are only four towns—the incorporated city of Bishop, with a population of 1,500; Lone Pine, with a population of 300; Independence, 200, and Big Pine, 200. Bishop has a sewerage system, the sewage being treated in a septic tank which discharges through ditches on to land. The other hamlets are without sewers. It will thus be seen that the catchment area of the aqueduct system is very free from contamination agencies. Moreover the rugged steepness of the Sierra range and the comparatively small area of irrigable land on the Owens valley floor preclude the possibility that growth of population will ever prove a menace to the purity of the water supply.

Moreover the regulating gates at the inlet of the aqueduct, as well as diversion gates in the 61 miles of conduit leading to the Haiwee basin, provide for proper selection of water. Flood periods and the first run-off in early spring find the inlet gates closed and the diversion gates open.

Properly speaking, the Haiwee reservoir is designed as a storage and regulating reservoir—like the balance



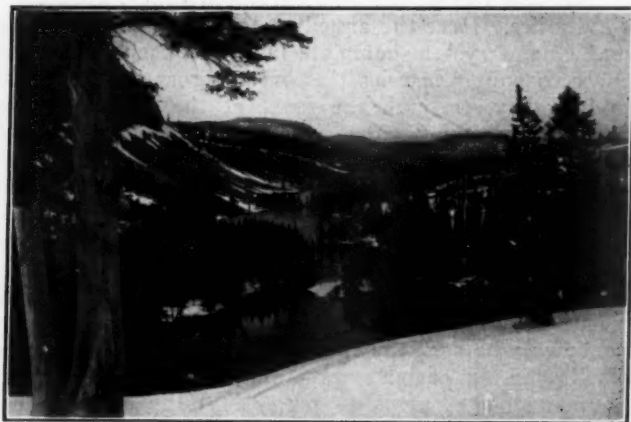
COTTONWOOD CREEK, JUNE 6, 1915.

Next to Owens River, This is the Largest and Most Important Stream Flowing Into the Aqueduct.

wheel of a clock, it serves to regulate the flow of the entire aqueduct system. However, from the standpoint of the sanitary engineer, this basin as an agency for sterilization is pre-eminently the most important adjunct of the work. In a recent suit in which the city of Los Angeles was a party, this reservoir was cited by a well known engineer as "unique among the storage reservoirs of the world." With an elevation of over 3,700 feet, this reservoir has been formed by damming both ends of a pre-historic river channel. From inlet to outlet its length is 7.25 miles, its width ranges from .50 to .75 miles and its average depth 30 feet. This great reservoir when filled to the high water level has an impounding capacity of 20,800 million gallons. It lies within a country that is almost rainless and practically a desert, and the watershed, which is small and almost devoid of run-off, has the reservoir keeper and his wife as its sole inhabitants. The quality of water entering it is possible of selection, as above described, and enters at its most northerly end. The reservoir outlet is located at the extreme southerly end, so that the whole length of the basin must be traversed, with no possibility of short circuiting, before the water again begins its course through pipe lines, tunnels and conduits toward Los Angeles. The region is one wherein the sky is practically cloudless. Days of strong sunshine succeed each other with almost unfailing regularity, while temperatures range from 120 degrees F. to freezing in winter. Prevailing winds are of a nature to retard rather than hasten the flow toward the reservoir outlet.

Dr. A. C. Houston's researches in reservoir storage were held well in mind in the location and construction of this basin, and the reservoir possesses almost ideal conditions as a purification agency. In his experiments to determine the period representing the liability of pathogenic bacteria causing water borne diseases, Dr. Houston demonstrated that the life of such organisms out of their native habitat is very brief. The life of the most resistant typhoid bacilli in stored water was shown not to exceed 24 days. Even under full operation the storage in this reservoir alone would amount to 30 days; and with the time required to pass through the entire system of aqueduct and city trunk line reservoirs to the southward, a total minimum of 65 days would have transpired. With the present draft of 26,000,000 gallons per day, the time interval amounts to not less than 468 days.

From the Haiwee reservoir the water is carried in closed conduits, inverted steel siphons and concrete lined tunnels to the Fairmont reservoir. Acting on the theory that pressure might be conducive to the destruction of pathogenic bacteria, shortly after the aqueduct was placed in commission a series of bacteriological tests were conducted at the intake and outlet of the Jawbone inverted



TWIN LAKES, SOURCE OF OWENS RIVER. TAKEN JUNE 3, 1915.



LOWER SAN FERNANDO RESERVOIR.
At the Inlet of the Los Angeles Aqueduct.

steel siphon. This siphon has a fall of 850 feet in a length of 8,000 feet, with a maximum pressure of 365 pounds. The results of the investigation, while not carried to a full conclusion at the time, were not conclusive.

The Fairmont reservoir is primarily a regulating basin designed to govern the flow through the Elizabeth tunnel for power purposes. The storage under full draft would amount to only about five days. In this connection it is interesting to note that here also, as in the case of all the six reservoirs of the aqueduct system, the drainage tributary to the reservoir is without human habitation.

After passing through Elizabeth tunnel, the water will descend 941 feet through penstocks into the turbines of hydro-electric station No. 1 (now nearing completion). From a purification standpoint the aeration here received as well as in a second power drop of 560 feet, and at the aqueduct outlet where the water has a fall of 161 feet over a cascade 1,660 feet in length, is of great importance.

From the Cascades the water may be diverted for storage in the San Fernando reservoir, of 7,000,000,000 gallons capacity; or the amount required for Los Angeles consumption can be transported through the city trunk line, which includes one regulating reservoir of 42 million gallons capacity (Upper Franklin) and a storage and regulating reservoir (the Lower Franklin) of 360 million gallons capacity. Following this route the water is distributed in Los Angeles after having been transported a total distance of 258 miles.

Bacterial examinations conducted frequently at the Upper Franklin reservoir, 13 miles from Los Angeles, show that, for an untreated water, the supply is very free from bacterial life. Incident to the regular work of the bacteriologist and to explain the presence of *b. coli* found in the reservoir but not in the inlet flow, two ducks were shot this fall and their intestinal tracts examined on the supposition that the wild fowl which frequent the reservoir were partly if not wholly the cause of the *b. coli*. As suspected, the organism was found present in great numbers in each case, "the average being about 50,000,000 per gram of dejecta in the intestinal canals."

Should it ever become necessary to employ artificial sterilization treatment, conditions are admirable for the installation of chlorination apparatus at the Lower Franklin reservoir, ten miles from the city.

From the nature of the region in which the water is collected and the ensuing storage, the supply is practically colorless and free from stain. The mineral content would be high for an eastern city, as chemical analyses show the water to contain from 15 to 22 grains of mineral matter per U. S. gallon. Such a water, however, on the Pacific coastal plain is classed as of low content. For instance, the water of the Los Angeles river, from which Los Angeles since its founding has received its supply, runs from 29 to 33 grains per U. S. gallon.

Only one point as to the potability of the aqueduct

supply remains for comment. This is the subject of algal growths. With week after week of glaring sunshine, no other part of the United States is more conducive to the development of this water evil than southern California. To obtain surcease, the Los Angeles water works was among the first to adopt the covered reservoir as the only satisfactory remedy, and at large expense has followed this plan (with one exception, that of a large reserve reservoir) on its thirteen distributing reservoirs of the Los Angeles river system. Obviously this is an impossible procedure on the aqueduct system because of the area and depth of reservoirs.

In the fall of 1914 (the aqueduct began service in Los Angeles on July 14 of that year) algae were in evidence and much complaint from customers was received. This was due in large measure, no doubt, to the newness of the reservoirs through which the water passed. During the summer just passed the issue was awaited not without anxiety, but the character of the water in Haiwee at the end of November, although containing some algae, was pure and sweet and exceeded the most sanguine expectations of the chief engineer. The water had been stored for a period of one year and ten months. The varieties found in the largest numbers were *Stephanodiscus Niagareae*, *Oscillaria* (blue green) and *Anabaena circinalis*. Whether another year will prove the quality in this regard or bring forth some other type of alga which will find the conditions conducive to its extensive development remains to be seen.

Close study of all the reservoirs has been undertaken by Dr. Carl Wilson, attached to the water works staff, with the intent of making a study of the life history of the different forms of this character of reservoir life as it is realized that herein lies a very real problem of the Water Department.

NEW HAVEN FIGHTS STREET LITTERING.

The city of New Haven, Connecticut, has been conducting a campaign against the littering of the streets with loose bits of papers, fruit and other articles thrown carelessly away. Mayor Rice issued extended statements to the departments of public works, police and education, urging co-operation in stopping the laxity which has been general in tossing pieces of refuse into the streets or upon the sidewalks. The department of public works was admonished to exercise greater care in cleaning the streets, and cans were placed on most of the principal



TUNNEL PORTAL AND CASCADE AT TERMINUS OF LOS ANGELES AQUEDUCT.

Aeration of Water Secured by Planting Boulders in the Concrete Bottom of Water Course. Flow Was About One-fourth Capacity When Photograph Was Taken.

street corners into which articles to be discarded could be placed, instead of being thrown into the streets.

The police were sent thousands of copies of the strict ordinances of the city which prohibit the throwing into the streets of paper, &c. In all the schools of the city special exercises were held in which the teachers explained the importance of clean streets and of an attractive city in general, and compositions and poems were written by the children on the subject. General interest was expressed by the school children, and Mayor Rice has offered four prizes to be awarded to the children of the four upper grades of the schools for the best essays on the importance of maintaining a clean city. The children of the schools pledged themselves not only to personally refrain from littering the streets, but also to use their influence to restrain other persons from doing so.

LOSSES IN FIRE HYDRANTS*

Actual Measurements of Losses in Various Parts of Hydrants in Regular Service—Details of Design Suggested by Tests.

By CALEB MILES SAVILLE†

Recently two tests have been made in Hartford to determine the capacity of the supply and distribution system under conditions of very large draft. Some very interesting data were obtained, some of purely local application and others of more general interest. From this latter class is taken the matter of losses in fire hydrants. The hydrant used was a 5-inch standard make. The test was run to the extreme limit of dis-

*Portion of paper delivered before the New England Water Works Association, Dec. 8, 1915.

†Chief Engineer, Board of Water Commissioners, Hartford, Conn.

charge and the results obtained do not specially reflect on this particular type of hydrant, which our experience has shown to be very satisfactory, but are believed to be applicable in a greater or less degree to most hydrants now on the market when used under the conditions of the test herein described.

The data presented are given to indicate what limits of discharge and loss of pressure may be expected under a range of draft. It is believed that the test was made absolutely under working conditions of service and the data given may be taken as of practicable application and without the refinements of a testing laboratory. The data and results are shown in detail in the table and diagram.

A description of the test and the conditions under which it was made may be stated very briefly.

The hydrant was located in a portion of the congested-value district, and at a point where the ordinary pressure is quite high. The water drawn from the hydrant was discharged into the Park river, which flowed nearby. No special preparation was made for this test, as the intention was to get working conditions as far as possible. The maintenance force of the water department excavated the trench and tapped in gauge connections as shown on the plans and elevation at the bottom of the diagram. Mercury differential gauges were used when the difference in pressures was rather small, and Crosby test gauges were used when the difference was too large to be read on the mercury columns. Members of the engineering staff affixed the gauges and operated them throughout the test. Fire department men did all the work connected with hose operation under the personal direction of the chief, John C. Moran, whose interest, intelligent co-operation and desire to obtain facts applicable to fire department matters has been of the greatest assistance.

TEST OF FIVE-INCH FIRE HYDRANT.

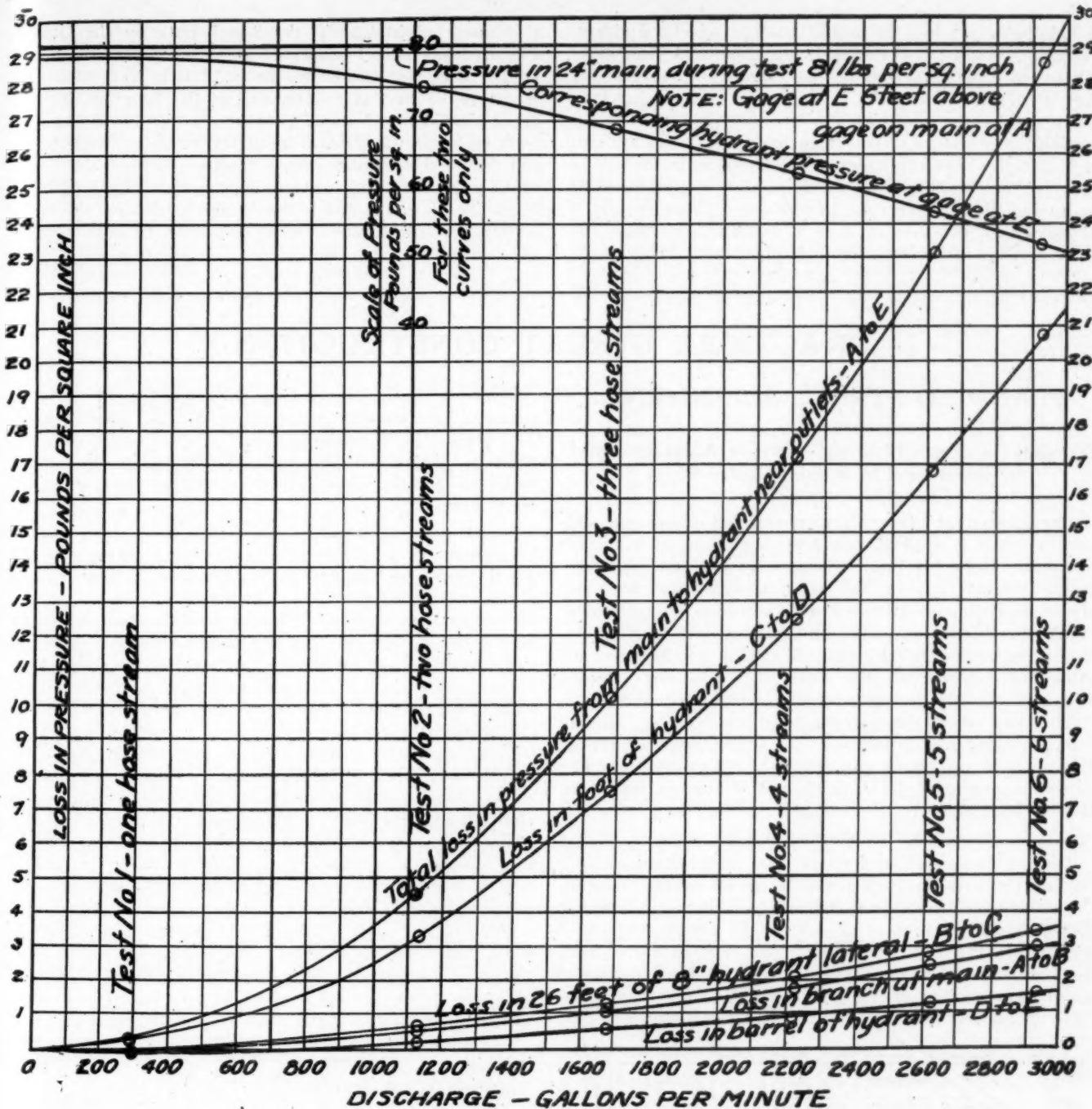
Pattern With Four 2½-Inch Nozzles and One Steamer Nozzle. One 50-ft. Length of 2½-Inch Hose Was Attached to Each 2½-Inch Hydrant Nozzle and Two 50-ft. Lengths Were Siamesed to the Steamer Nozzle. For Distances and Elevations. See Sketch.

Elevations. See sketch.																				
Test No.	No of streams.	Hose No.	Nozzle pressure by pitot			Losses in Pressure												Pressures.		
			Size of hose nozzle, ins.	tube gage, lb. per sq. in.	Discharge through nozzle, gals. per min.	Main to hydrant branch A to B		In 26' of 8" hydrant lateral B to C		In foot of hydrant C to D		In barrel of hydrant D to E		In 24-in. main A	In hydrant at E	In hose No. 4. at hydrant.				
						ins. mer- cury.	lb. per sq. in.	ins. mer- cury.	lb. per sq. in.	ins. mer- cury.	lb. per sq. in.	ins. mer- cury.	lb. per sq. in.				ins. mer- cury.	lb. per sq. in.		
1	1	1	1½	67	305	1/16	0.03	1/16	0.06	1½	0.23	0	0	81	75	..	..	..
2	2	1	1½	38	560	1	0.45	1 1/16	0.60	7½	3.4	½	0.23	81	75	..	..	..
		2	1½	41	585															
					1,145															
3	3	1	1½	32	515	2¼	1.02	2½	1.14	16¼	7.6	1¼	0.57	82	69	..	..	..
		2	1½	38	560															
		3	2	26	610															
					1,685															
4	4	1	1½	32	515	3¾	1.71	4¾	2.16	..	*12.3	2	0.91	80	61	53	..	..
		2	1½	37	552															
		3	2	26	610															
		4	1½	35	538															
					2,215															
5	5	1	1½	31	507	5 9/16	2.36	6¼	2.84	..	*16.8	3	1.36	81	57	49	..	..
		2	1½	34	530															
		3	2	24	584															
		4	1½	31	507															
		5	2	18	505															
					2,633															
6	6	1	1½	25	454	6½	2.95	7¾	3.35	..	*20.8	3¼	1.48	81	51	43	..	..
		2	1½	28	481															
		3	2	20	532															
		4	1½	28	481															
		5	2	17	490															
		6	2	17	490															
					2,928															
NOTE: Hoses Nos. 1, 2, 3 & 4 attached to hose outlets. Hoses Nos. 5 & 6 siamesed to steamer outlet.																				

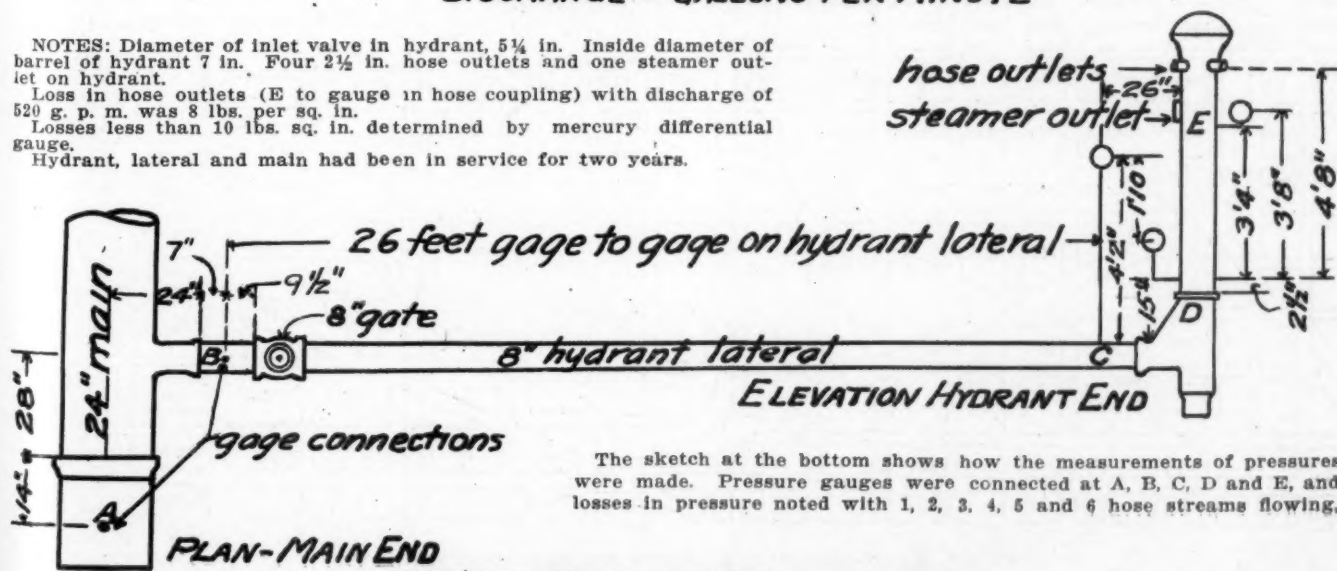
NOTE: Hoses Nos. 1, 2, 3 & 4 attached to hose outlets. Hoses Nos. 5 & 6 siamesed to steamer outlet.

*Losses obtained from readings of pressure gages at C and at D as follows:

Test.	Gage at C.	Gage at D.	Difference.	Correction for diff. in elev. of gages at C & D.	Corrected Loss C to D.
4	76.5	65	11.5	1' 10" = 0.8 lb. per sq. in.	12.3
5	74	58	16	0.8 lb. per sq. in.	16.8
6	72	52	20	0.8 lb. per sq. in.	20.8



NOTES: Diameter of inlet valve in hydrant, 5 1/4 in. Inside diameter of barrel of hydrant 7 in. Four 2 1/2 in. hose outlets and one steamer outlet on hydrant.
Loss in hose outlets (E to gauge in hose coupling) with discharge of 520 g. p. m. was 8 lbs. per sq. in.
Losses less than 10 lbs. sq. in. determined by mercury differential gauge.
Hydrant, lateral and main had been in service for two years.



The sketch at the bottom shows how the measurements of pressures were made. Pressure gauges were connected at A, B, C, D and E, and losses in pressure noted with 1, 2, 3, 4, 5 and 6 hose streams flowing.

PRESSURE LOSSES IN FIVE-INCH FIRE HYDRANT.

The principal loss is in the bottom of the hydrant, starting with an inappreciable amount with one hose stream of about 300 gallons per minute and reaching a loss of nearly 22 lbs., or 73.5 per cent of the total loss, when the discharge was 3,000 gallons per minute. The advantage of the large lateral from the main to the hydrant is shown by the small losses which occurred here, the loss in the branch and lateral under maximum flow being less than 5 per cent of the total. Incidentally it appears that the loss in a 24 x 6 branch is about the same as that in 30 feet of 8-inch pipe, there being prob-

ably some slight loss in the 8-inch gate on the lateral. The hydrant barrel seems of ample size.

The principal conclusion to be drawn from this test seems to be that the waterway at the base of the hydrant should be of ample proportion, devoid of obstructions so far as possible in the matter of valves and stems, and provided with smooth passage for changing the direction of the incoming water. It seems desirable to have large-sized laterals, and a size larger branch on the main with a reducer to the lateral would be of considerable advantage.

PRACTICAL STREET CONSTRUCTION

PLANNING STREET ALIGNMENT

Economy In Street Planning—Relative Areas Occupied by Streets and by Building Lots—Street Lengths—Straightness.

The alignment of a thoroughfare is all-important, for such a street is used by numbers of citizens as a means of getting from one point to another; but that of a by-street is much less so, for its most important features are its contribution to the health, comfort and pleasure of a few residents, and where it leads, or how, is of minor importance. Hence the planning of the alignment of thoroughfares should precede that of the minor streets. When it is fixed, the minor streets can be adapted to it.

The two most important considerations in thoroughfare planning are adjustment to traffic and economy. Economy in pavement construction, repair and maintenance are familiar ideas to all, but economy in street lay-out is apparently overlooked in most cases.

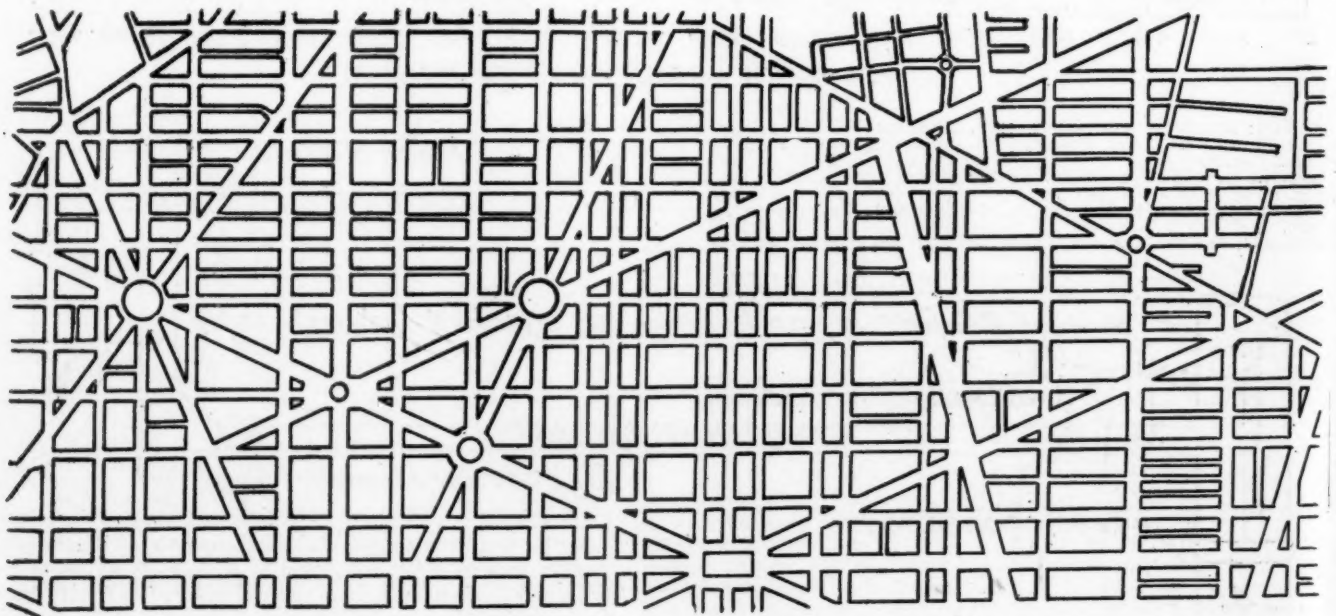
ECONOMY IN STREET PLANNING.

The economy referred to is that involved in apportioning the area to be devoted to street surface and in the utilization of the land. Assume two cities, one having 30 per cent of its area in streets and 70 per cent in occupied land; the other having 50 per cent in each; and both having the same shape. Then, to hold the same population on lots of the same size, the latter city must have an area 40 per cent greater than the other, and any

dimensions of the larger area will be about 18 per cent greater than corresponding ones of the smaller area. Therefore, the thoroughfares (and other streets as well) must be 18 per cent longer, and cost 18 per cent more with the greater, than with the smaller percentage of street area.

As to price secured for the land, there is a similar difference. It is evident that, assuming building lots are worth the same amount per square foot in each city, a given amount of total area (which was once all private property) will yield only five-sevenths as much in one case as in the other. But the assumption will not hold if the saving in street area is carried to an extreme, for if the streets are too far apart to permit of dividing into lots of advantageous size, or to give adequate access to all parts of the area, or if they are so narrow that traffic is congested and sufficient light and air can not reach the lower stories of buildings, then the price obtainable per square foot will be much less than under more favorable street arrangement. Just what the ratio between street area and lot area should be, in each class of city subdivisions, to produce maximum returns from sale of land is one of those subjects concerning which there appears to be little definite information.

The relative area occupied by streets is determined to some extent by the shape of the blocks which they surround. Geometry teaches that the length of street (or perimeter) to surround a given area is least for a circle, less for a regular polygon than for an irregular one, and



PART OF WASHINGTON, D. C., SHOWING DIAGONAL STREETS.

Fifty-three per cent. of the area of Washington is occupied by streets, and an additional amount by parks and "circles."

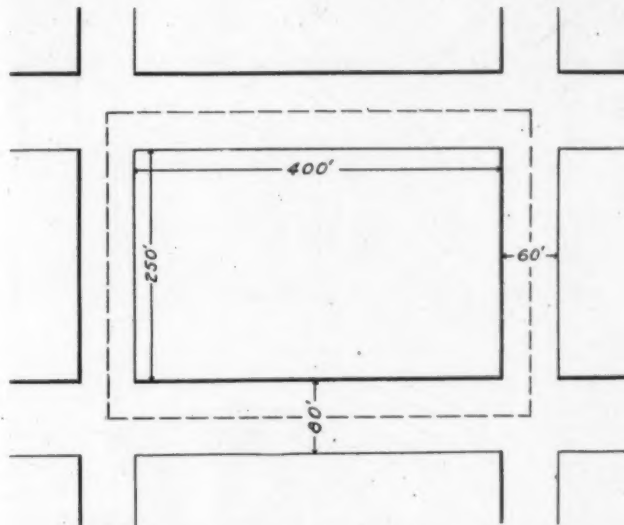
increases as the number of sides decreases. But if we try to use circles and combine them in groups we find waste areas which, if included in the street area, would greatly increase this. The only regular figures which will not produce such waste areas are hexagons, squares and triangles. The first will give the least area of streets, but the hexagon does not lend itself readily to convenient subdivision into lots, and the streets will all be winding, straight ones being impossible. The triangle permits straight streets, but is uneconomical of space and is inconvenient for subdivision into lots as a universal form. Triangles can be used to advantage in some cases, however, as will be explained later.

Squares are nearly as economical of area as hexagons, give straight streets throughout and are most convenient for lot subdivision, and they (or rectangles, which may be considered as modified squares) are the most common form of subdivision.

Given a group of circles with 250-ft. diameter and streets 60 feet wide, and the streets and waste areas will occupy 41 per cent of the total area. Circumscribe a hexagon around each circle, with 60-ft. streets, and the street area is reduced to 35 per cent. If we use squares having the same area as the circle, with 60-ft. streets, these will occupy 38 per cent of the total area. To calculate the percentage of the total area occupied by streets

when all block sizes and street widths are uniform throughout the area considered; if we call L and l the dimensions of the block and W and w the corresponding street widths, then the percentage is $100 \frac{(L+W)(l+w) - L \times l}{(L+W)(l+w)}$

In the illustration, the block is 250 by 400 ft. and the streets 60 and 80 ft. wide, and the formula becomes 100



TYPICAL BLOCK IN RESIDENCE DISTRICT.

$$\frac{(330 \times 460) - (250 \times 400)}{330 \times 460} \text{ which gives 34.1 per cent.}$$

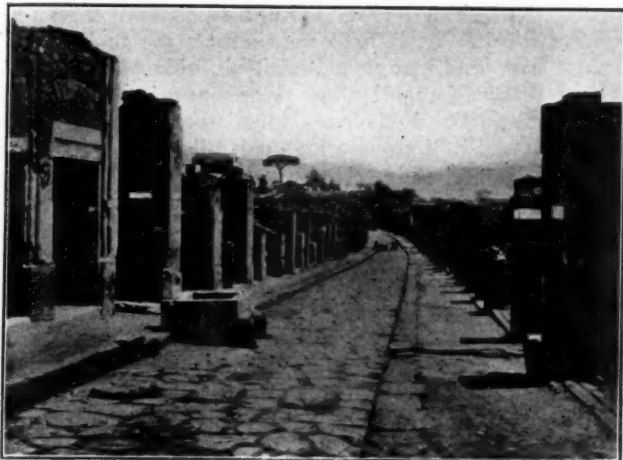
A square having the same area would be 316.2 ft. on a side. If we take such a square with 60 ft. and 80 ft. streets, we have 100

$$\frac{(376.2 \times 396.2) - (316.2 \times 316.2)}{376.2 \times 396.2} \text{ giving 32.9 per cent.}$$

That is, if the city be laid out in rectangles of the dimensions shown, instead of squares of equivalent area, the street area will be 3.6 per cent greater

$$\left(\frac{34.1 - 32.9}{32.9} \right)$$

The factor of economy of land area is one of the least important in planning streets, since when they are first planned the land is generally quite cheap compared with the value it will have as either street or building area



STRADA DEL ABBONDANZA, POMPEII.

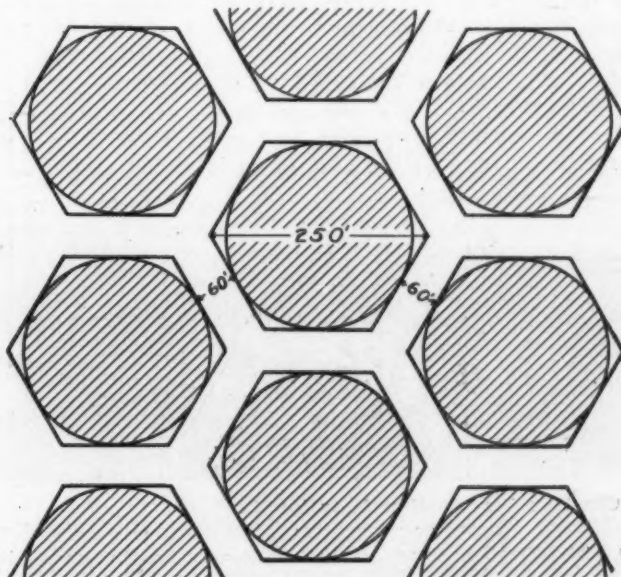


HIGH STREET, OXFORD.

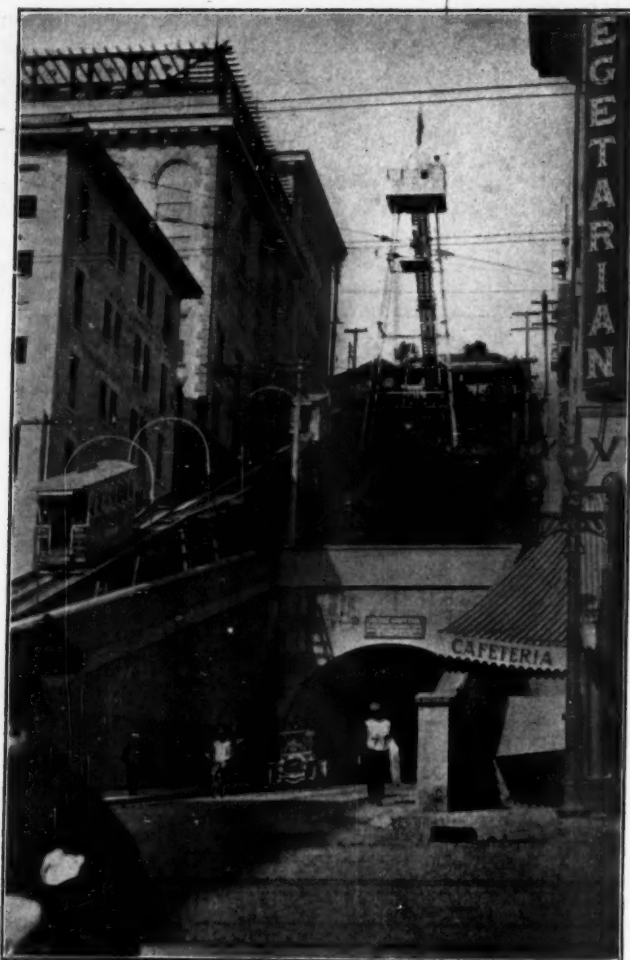
Washington (see opposite page) with its broad diagonals is excellently planned for a "show" city with magnificent buildings, but the dispersion of building lots is unsuitable for a business city.

The illustration of High St., Oxford, shows the pleasing effect of a long sweeping curve. The similarity of this and the Pompeian street is striking. (See page 42).

The cut at the right shows the impossibility of obtaining straight streets using hexagonal blocks, and the waste areas if circles are used. With the latter, the area outside the circles is 41% of the entire area. With the hexagons, the street area is 35%, only 3% less than if squares be used, and squares would give straight streets.



ARRANGEMENT OF CIRCULAR AND HEXAGONAL BLOCKS.



TUNNEL STREET IN LOS ANGELES.
Also street railway up steep surface of right of way.

when the city has spread to and beyond it. Conservatism from this point of view would lie in assigning abundant land for street width, since it is easy to transfer part of it to private owners later if desired, but expensive and sometimes physically impossible to secure adequate additional width.

But the effect of prodigality of street area on *lengths* of streets is a more important factor in the problem. As seen above, an increase of street area from 30 per cent of the total to 50 per cent adds more than 18 per cent to the lengths of streets necessary to accommodate a given population, and 12 per cent to the average of all the distances to be traveled by all citizens in passing from all points of the area to the center. This means an addition of 18 per cent to the amounts spent on constructing street pavements, sidewalks and other items of street construction and to the cost of maintaining and clean-

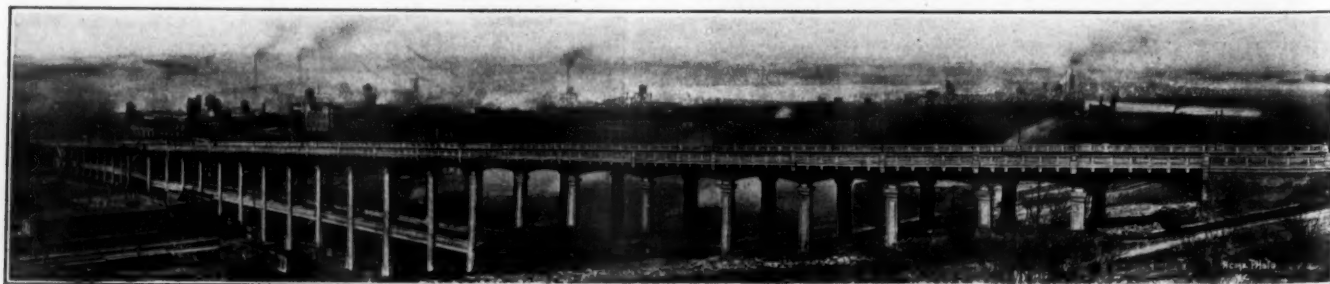
ing these; and an ever-continuing addition of 12 per cent to the time and energy (whether muscular or gasoline) consumed by the citizens in passing between their homes and business, shopping or pleasure centers.

The area devoted to streets is determined by their width, length and number. The matter of width will be considered later. The length and number are fixed by the skeleton outline of alignment. The number of total streets of all kinds is fixed to a large extent by the sizes of blocks, which also will be considered later; but the number of main thoroughfares is primarily a matter of traffic demands, modified by consideration of safety, health and economy.

As to length, since "a straight line is the shortest distance between two points," straightness is desirable in thoroughfares, and gives a minimum of pavement area. As regards the convenience to traffic, however, a straight line is not always the shortest distance, if time and energy consumed be the measure; for a detour around a hill or valley may require less of each than a straight course across it, especially if we consider the time required to haul a given tonnage and that the straight, hilly course would necessitate lighter loads and more of them. But even in such cases the grade can be kept low and still the line can be made straight, if the traffic warrants the expense, by tunneling the hill or carrying a viaduct across the valley. Such tunnels have been constructed in Los Angeles, San Francisco and other cities and are under construction in Pittsburg; and viaducts are to be found in most large and many small cities in hilly country. On the west bank of the Hudson river, opposite New York, are several inclined viaducts for surmounting a steep, high hill. In Pittsburg are inclined railways for carrying both vehicles and pedestrians up steep hillsides. In New York a street tunnels to the center of a hill and pedestrians are there lifted to the summit in an elevator. This subject also will receive more extended discussion later.

From the above illustrations it appears that a straight alignment is possible under almost any conditions of topography; but these expedients for avoiding detours are not only expensive, but are not so pleasing to travel, and are of no service to the land along their course; and a detour of moderate extent is preferable for most reasons.

As to number of thoroughfares, considering traffic only, the greater the number the better. But here economy must step in to limit the number. The greater part of the traffic will wish to reach certain centers—a shopping center, manufacturing center, railroad or waterway freight station, etc.; while a bridge across a river, a valley-street between hills and other points determined by topography will be focusing points for traffic even more definitely fixed. The greatest convenience for traffic will be afforded by a number of streets radiating from such a point in all directions like spokes from a hub. Many large cities have such radiating streets, most of



Courtesy Barrett Manufacturing Co.

DOUBLE-DECK VIADUCT COMPANY CONNECTING TWO STREETS ON EACH SIDE OF A LOW AREA.
The Twelfth Street Viaduct, Kansas City, Mo., nearly half a mile long, connecting the railroad terminal, warehouse and factory district with the center of the city, crossing thirty-two railroad tracks. Carries vehicles, street railway and foot passengers.

which probably were originally highways leading from adjacent villages or farming communities to the city in question. Most cities have at least four such streets, or rather two streets intersecting at right angles and extended both ways from the intersection. The advantages of adding additional radial streets and the treatment of them and of traffic centers will be discussed in the next article of the series.

RESURFACING OLD MACADAM ROADS*

Type of New Surface—Preparing the Foundation—Water-Bound Macadam—Bituminous Macadam—Selecting Materials.

One of the most important problems confronting road authorities today is the question of resurfacing or rehabilitating old stone roads. This condition in most cases is the result of neglect. Failure to make repairs or to restore the worn-out portions before a road has deteriorated through to the foundation necessitates the rebuilding of the road, and a large expenditure; whereas, through skilled maintenance, the outlay can be reduced materially and spread over a period of years. There are of course other reasons for resurfacing old roads—as, for instance, the improper selection of the original material, which is responsible for rapid deterioration, and the constantly increasing and varied traffic causing abrasive action too severe for the type of road. This latter condition is noticeable particularly in suburban communities and communities where water-bound macadam roads were laid in the early stages of development, and where the population has increased rapidly and where all classes of vehicular traffic have caused the original roadway to deteriorate more rapidly than would have been the case had the development not occurred, thus creating the necessity for repairing and resurfacing in order to make the wearing qualities of the road as good as those in the nearby cities.

The essential points to be considered in the selection of a proper type of surface for an old stone road are the character and amount of traffic, the grades, and, as a rule, that most important factor, the funds available for the work. When the traffic has been determined and the character of surfacing selected a thorough study should be made of the existing foundation and drainage facilities. Many surfaces have been sacrificed for the want of proper attention to the foundation, and too often it is taken for granted that any stone road is a suitable base for most any type of surface. Test holes should be made at sufficient intervals in the road to determine the depth of the existing foundation, and usually it is found that a considerable portion must be restored before a surface can be applied. Irrespective of the type of surface selected, the preparation of the foundation must be given the same careful attention. Too much stress cannot be laid on the desirability of having proper lines and grades before resurfacing, in order to avoid increasing or perpetuating the difficulties of future improvement of these roads. The question of providing proper underdrainage must be considered, and drains installed where necessary.

WATER-BOUND MACADAM.

The methods used in the preparation of the base for both water-bound and bituminous macadam are the same. If any holes or depressions are found in the base, the road should be dug out and replaced with good-sized clean stone, keyed with a smaller size and rolled with a ten-ton power roller until thoroughly compacted. The roadway should then be cleaned thoroughly and the ex-

isting surface broken or loosened with picks, harrows, or, if necessary, rollers equipped with spikes, so that the new material will bind properly with the old surface. Where the new surface is wider than the old base or where, in improving the lines, it rests partly on the old surface and partly on the old shoulder, it is necessary to provide a new first course or base where an old one does not exist, in order to support properly the top layer or wearing surface.

After the base course has been finished, there should be laid a layer of properly graded, approved stone, passing a two and one-half inch mesh screen, and being retained on a one-inch mesh screen, this stone being known as "1½-inch." The stone should be spread upon the base course with shovels, from piles along the side of the road or from a dumping board, but in no case should the stone be dumped upon the first course surface. This layer should be rolled with a roller weighing not less than ten tons until it is compacted to a firm and even surface. The total thickness of the surface course should be not less than three or four inches after rolling. When a surface course of a depth of three inches is specified, it should be laid in one layer, and a four-inch course should be laid in two layers of two inches each.

Should difficulty be experienced, while rolling, in getting the stone to compact thoroughly, sprinkling with water or spreading lightly with screenings will prove beneficial.

After the surface course of stone has been thoroughly rolled, screenings, varying in size from dust to ¾ inch, should be spread with shovels from piles along the side of the road or from dumping boards, but, again, in no case should the screenings be dumped directly upon the surface of the stone. These screenings should then be thoroughly rolled with a ten-ton steam roller, additional dry screenings applied, and the rolling continued without the use of water until the interstices of the stones are filled. The road should then be sprinkled with water, rolled, additional screenings spread, and the sprinkling and rolling continued until the surface is well bonded and set. The rolling, in all cases, should begin at the sides and work toward the center of the roadway, thoroughly covering the area with the rear wheels of the roller, and should be continued until the surface is hard and smooth and shows no perceptible tracks from vehicles passing over it.

To protect a water-bound macadam road from the ravages of automobile traffic it should be given a bituminous surface treatment of either approved tar or asphalt. Prior to applying this bituminous material, the surface of the road should be cleaned thoroughly, by sweeping with machine and hand brooms. After all the caked dust has been scraped off and the stone exposed uniformly over the surface, the bituminous material should be applied.

BITUMINOUS MACADAM.

In resurfacing with bituminous macadam, the base course should be prepared as for water-bound macadam, after which stone passing a two and one-half inch screen and retained on a one-inch screen should be spread upon the base course with shovels from piles along the side of the road or from a dumping board to a depth of three inches after rolling. After the broken stone has been laid and placed true to line and grade and cross-section, it should be rolled with a roller weighing not less than ten tons until the stone has been thoroughly compacted and ceases to creep in front of the roller. When the rolling has been finished, there should be spread evenly over the surface a quantity of approved bituminous binder, not less than 1½ nor more than 1¾ gallons to each square yard of surface area. The binder should be

*From Paper Before the Pan-American Road Congress by William D. Uhler, Pennsylvania State Highway Department.

heated to the proper temperature for the material used. After the bituminous binder has been applied, there should be spread a layer of $\frac{3}{4}$ -inch dry, crushed, approved stone, free from dust, and in such quantity as will just cover the surface and fill the surface voids. Rolling should be continued until the surface is thoroughly bonded; the surface then should be swept clean of all loose stone and an application of bituminous binder, of approximately one-half gallon to the square yard of surface area, applied evenly. This binder, in turn, should be covered immediately with a thin layer of dry stone chips, free from dust and rolled lightly. The quantity of chips should be just sufficient to absorb the excess of bituminous material remaining on the surface and to prevent the existence on the surface of an excess of binder.

Bituminous concrete and sheet asphalt pavements should be laid on a concrete base, instead of on the old existing macadam foundation which, heretofore, has been the generally accepted practice for country roads. In view of the increased amount and change in character of traffic, even though slightly more expensive, it is advisable to provide for either a four-inch or a five-inch concrete base on top of the broken stone or telford base, due to the tendency of macadam to shift or to consolidate further under traffic and possible sub-grade trouble, all of which tend to bring about a wavy or uneven condition of the surface.

In the resurfacing of water-bound macadam it is frequently the case that the engineer in charge of the work allows too small a stone to be used, which, it is true, will require decidedly less rolling but will not stand the motor traffic of today.

Another fault quite often found is the spreading of screenings before the one and one-half inch stone is thoroughly locked, and very frequently using too large quantities of screenings, thereby causing a heavy crust to form on the road surface.

The success of the bituminous treatment of water-bound macadam roads depends entirely upon the cleanliness of the road before the application of the material. Many failures are due to the lack of proper care in this most important detail. In cleaning the surface of the road the sweeping should be windrowed along the edges of the wearing surface, in order to prevent the running off of the bituminous material, which later should be swept back on the road. Special attention should also be given to the applying of the chips, just sufficient chips being used to prevent the traffic from picking up the bituminous material.

In bituminous macadam or penetration work no bituminous binder should be applied unless the stone surface is thoroughly dry, and the temperature of the air is 65 degrees or higher, and special attention paid to the heating and applying of the binder.

One of the important features in connection with obtaining the best results in bituminous concrete construction is the use in the wearing surface of good, hard, durable stone, free from dirt and decomposed material, as decomposed stone in the mixture will naturally develop weak spots in the pavement and ultimately result in failure.

The penetration of the asphaltic cement used in the mixture should be governed by the character of the traffic requirements.

As before stated, the success of all bituminous concrete and bituminous pavements is very largely dependent upon the rolling, and the best results can be obtained only by using a light roller for the initial compression and a heavier roller for the final compression, with an equal amount of transverse and longitudinal rolling.

In the laying of sheet asphalt or bituminous concrete, where brick gutters are used and adjacent to block runners along car tracks, it is good practice to lay the finished surface of the pavement from one-eighth to one-quarter of an inch higher than the brick gutters or runners. It is difficult in the rolling to secure final compression next to these blocks, and traffic will further compress that portion of the pavement, naturally causing the development of low spots which hold water and result in deterioration.

Special attention should be paid also to the heating of the various aggregates entering into the pavement and also of the combined mix, as many failures are caused by over-heating. No over-heated material should be used under any circumstances, as failure is bound to result.

ACCIDENTS DUE TO AUTOMOBILES.

Preliminary statistics for 1914, which indicate that during the five years from 1909 to 1914 the number of automobiles in use in the United States increased more than twice as rapidly as the number of fatalities caused by them, were recently made public by the United States Census Bureau.

At the close of 1909, according to figures compiled by the National Automobile Chamber of Commerce from state registration reports (due allowance being made for duplicate registrations), the number of automobiles in use in the United States was approximately 200,000; by the close of 1913 it had risen to 1,270,000; and a year later, at the end of 1914, it was 1,750,000. In the meantime the number of deaths due to automobile accidents and injuries increased from 632 in the death-registration area in 1909, containing 56 per cent of the population of the United States, to 2,623 in the same area in 1914; and the increase from 1913 to 1914, for the registration area as constituted in 1913 (then containing 65 per cent of the population of the country), was from 2,488 to 2,795. Thus a five-year increase of 775 per cent—accepting as reliable the figures compiled by the National Automobile Chamber of Commerce—in number of machines has been accompanied by an increase of 315 per cent in automobile fatalities; and a one-year increase of 38 per cent in number of machines has been accompanied by an increase of 12 per cent in fatalities.

Perhaps a more reliable comparison, from the statistician's point of view, can be made between the increase in number of automobiles in use and the increase in the rate per 100,000 population for deaths caused by them. This is because, with a given number of machines in use in a given area, the fatalities due to them will tend to be proportional to the population of that area. When the comparison is made on this basis, it appears that a five-year increase of 775 per cent in number of machines has been accompanied by an increase of 258 per cent—from 1.2 to 4.3 per 100,000 population—in the death rate resulting from automobile fatalities. Similarly, a one-year increase of 38 per cent in number of automobiles has taken place along with an increase of only 10 per cent—from 3.9 to 4.3 per 100,000—in the death rate charged to them.

One cause of this proportional decrease in the destructiveness of the automobile is undoubtedly to be found in a reduction in average annual mileage per machine; but, after due weight is given this factor and a suitable margin is allowed for possible error resulting from inaccuracy in the estimated portion of the automobile statistics, the figures still appear to furnish ample justification for the conclusion that the automobile today is being driven with greater care and more regard for public safety than it was a few years ago.

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CHANGE OF ADDRESS

Subscribers are requested to notify us of changes of address, giving both old and new addresses.

Contributions suitable for this paper either in the form of special articles or of letters discussing municipal matters, are invited and paid for. Subscribers desiring information concerning municipal matters are requested to call upon MUNICIPAL JOURNAL, which has unusual facilities for furnishing the same, and will do so gladly and without cost.

JANUARY 13, 1916.

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Purity of Los Angeles Water Supply.

That the construction of the new Los Angeles aqueduct and the reservoirs forming a part of the aqueduct system of water supply for that city has been conducted and terminated in a most creditable way is the opinion of the majority of engineers who are familiar with the work. Some mistakes were made, but their number and importance were small when we consider the magnitude of the work and the unusual conditions to be met.

That the fundamental plan of the supply was wrong, and the water which had been brought more than 250 miles at such enormous cost was not fit to drink, was the startling claim made a few months ago. Few who were well informed took this at all seriously, but the matter was pressed even to the courts, and the satisfactoriness of the supply was demonstrated. Whatever may have been the real inspiration of this attack, it is fortunate for the city and for those responsible for the work that the discussion was promptly carried to a finish and, we hope, has fully satisfied all citizens except the few whom nothing could convince.

The conditions as to the quality of the water are described in this issue. It is true that a few settlements occupy the drainage area from which the supply is drawn; also, we believe (although the writer does not state this) that there are some swampy spots and dead water in one or more of the reservoirs. But a storage of more than two months, a minimum time of eight or ten days of which is spent in the conduit itself, should be a sufficient safeguard against disease-producing organisms from this point, and it should not be difficult to protect from later pollution all conduits and regulating and distributing reservoirs. Cities can not expect, and very few even of the smallest can obtain, a public water supply which is absolutely free from any pollution, and Los Angeles would appear to be favored with an exceptionally uncontaminated supply.

Death by Automobile.

Millions are spent in this country each year on water purification, milk inspection and treatment, and in other directions with a view to decreasing the death rate from typhoid fever, and well spent, for the results are gratifying and pronounced.

The typhoid death rate the country over now averages about 17 per 100,000. The death rate from automobiles in 1914 was almost exactly one-fourth of this, and was an increase of 12 per cent over that of the year previous. It was probably almost one-third the typhoid rate in 1915.

The typhoid death rate is decreasing; that by automobile is increasing rapidly. It appears as though some of the money and energy being spent in typhoid elimination could produce more results in lives saved per dollar spent if applied to traffic regulation or other method of diminishing the danger from automobiles run by all who use the streets of cities, small as well as large. The saving of fifteen lives every day of the year is an end worth striving for.

Diverting Traffic to Relieve Congestion.

The description on another page of how Atlanta proposes to relieve traffic congestion on her principal main thoroughfare is an excellent illustration of a plan which could be adopted by many cities which are experiencing similar difficulties. The providing of one main route for traffic from the center of the city to the northern section was a proper move when the amount of traffic to be accommodated was small. Some cities waste money by adapting an unnecessary number of streets to heavy through traffic. But it would be a mistake not to recognize the necessity for more main thoroughfares when it arises and provide additional facilities for the growing traffic.

There are two general methods of doing this—widening the congested roadway and diverting part of the traffic to another. The latter is generally the cheaper and possesses other advantages, such as furnishing a practicable alternative route when the original one is torn up for repaving, pipe laying, etc.

The Atlanta case also illustrates the fact that the mere laying out of a street does not make a main highway of it. To be used as it should be, it must be adapted to such uses to as high a degree as possible. If for pedestrian shoppers, the sidewalks should be wide and well paved and through vehicle traffic kept out. If for through traffic, the roadway should be smooth, wide (at the expense of the sidewalks, if necessary), and have favorable grades. A standard street, meeting all varieties of street requirements, is yet to be designed.

and to that end shall make all appointments, subject, of course, to proper civil service provisions which are made a part of the model charter.

Except when the council is considering his removal, the city manager is entitled to be present at all the meetings of the council and its committees and to take part in their discussion.

A council elected at large is provided for cities of average size; but in cities of more than 100,000 population the city should, in the opinion of the committee, be divided into large districts, the size of which should never exceed 50,000, except in cities over a million. The purpose of this limitation is to keep the size of the district down to such a point that genuinely free competition for public office will prevail, the expense of a thorough canvass being not too great for an independent candidate who may lack the support of a permanent political machine.

The model charter contains up-to-date civil service, financial and franchise provisions, as well as other necessary features of a charter.

The committee consists, in addition to Mr. Foulke, of M. N. Baker, of the Engineering News; Richard S. Childs, New York City; John A. Fairlie, University of Illinois; Mayo Fesler, Cleveland; A. R. Hatton, Western Reserve University, Cleveland; Herman G. James, Austin, Texas; A. Lawrence Lowell, Harvard University; William B. Munro, Harvard University; Robert Treat Paine, Boston; Delos F. Wilcox, New York City; Clinton Rogers Woodruff, Philadelphia.

STREET CLEANING IN CLEVELAND

Performed Considerably Under the Appropriation—Unit Costs of Cleaning and Refuse Collection—Prices Received for Salable Refuse.

"I have the honor of returning \$35,584.65 of our 1914 appropriation back to the general fund," said Gus. H. Hanna, superintendent of street cleaning of Cleveland, Ohio, in his report for 1914. This is about 7 per cent of the appropriation, which Mr. Hanna saved by systematic economy and efficiency in performing the street cleaning, ash and rubbish collecting, and catchbasin and market cleaning for the city of Cleveland during the year 1914. And he hoped to make a better showing for 1915. Such ambition and performance are worthy of the highest praise.

During the year the department paid out \$176,948 in team hire, and a saving could be made, Mr. Hanna believes, by purchasing at least 75 horses for use in street cleaning and refuse collection. The department now has about one-third this number.

The streets are cleaned by flushing machines, pick-up gangs and "white wings" (patrol service). The payroll (including team hire) for operating the flushing machines was \$20,102; street car flushers, \$6,317; white wings, \$95,146; collecting waste paper, \$12,743; and miscellaneous street cleaning, \$66,258. Payroll for collecting ashes and rubbish, \$174,082; cleaning catchbasins, \$17,296; dumps, \$27,205; removing snow and ice, \$14,198. The salaries of superintendent and clerks were \$8,111; supplies, \$7,659, maintenance, \$5,965, and miscellaneous, \$17,194.

Including overhead charges, the following were the unit costs of doing work during the year:

Flushing streets, average, \$0.15338 per square (a square is 10,000 square feet), varying from a maximum of \$3.307 in February, when only 135 squares were flushed, to a

minimum of \$0.10226 in November, when 17,251 squares were flushed. The maximum amount per month was 45,705 squares, in July, when the cost was \$0.1537.

Cleaning by pick-up gangs averaged 89.118 cents per square, varying from a maximum of \$2.392 in February, when 541 loads were removed from 583 squares, to a minimum of \$0.6315 in June, when 3,609 loads were removed from 15,291 squares. The greatest number of squares were covered in June, 15,291; and the greatest number of loads in April, 7,540. During January, February, March and April about one load of dirt was removed from each square, on the average, while in June and July less than a quarter of a load per square was removed, and in August about one-fifth of a load.

Cleaning by the white-wings service averaged 42.786 cents per square; the maximum monthly average cost being in December, 57.032 cents, and the minimum in January, 25.025 cents. The maximum number of squares cleaned per month was 44,802, in June, at an average cost of 39.61 cents, and the minimum was 2,875, in December. During July and August, 0.065 of a load per square was swept up, while during March and April 0.112 of a load was removed.

During the year, 1,718,682 collections of ashes and rubbish were made, totaling 294,717 cubic yards, at an average cost of 71.4 cents per cubic yard, or 12.24 cents per collection. The average amount per collection was 4.6 cubic feet.

There were made 17,253 catchbasin cleanings, and 624 basins were relieved, at an average cost of \$1.131 per basin. The amount of dirt removed was not stated.

Cleaning markets cost \$11,966, 8,888 cubic yards of material having been removed, giving an average cost of \$1.346 per cubic yard. The ashes and rubbish are sorted over for salable materials, and the list of such collected and the prices received will interest most heads of similar departments in other cities, and may surprise some. The actual receipts by the department from the sale of such materials were \$22,590. The amounts of each class and prices received were as follows:

Salable Material Collected, Year 1914.

3,055 bottles	\$17.62
47,763 bottles, at ½c each	238.86
71,732 pounds bottles, at \$5 per ton	179.33
13 syphon bottles, at 10c each	1.30
238 jugs at 1c each	2.38
530 jugs, at ½c each	2.65
41,706 milk bottles, at ½c each	208.50
10 seltzer bottles, at 10c each	1.00
28,208 beer and pop bottles, at ½c each	141.04
3,025 peroxide bottles, at ½c each	15.13
220 Coca Cola bottles, at ¾c each	1.65
1,000 catsup bottles, at ½c each	5.00
Miscellaneous bottles	79.09
200,945 pounds broken glass	461.89
2,199 barrels	226.44
4,074,000 pounds manure, at 80c per ton	1,629.60
67 loads of manure, at 40c per load	26.80
4,468 pounds brass, at 66c per lb	176.46
2,880 pounds copper, at 11½c per lb	331.22
1,012 pounds mixed rubber, at 4c per lb	40.48
9,306 pounds rubber hose, at ¼c per lb	23.29
3,050 pounds zinc, at 3c per lb	91.50
506 pounds old alarm clock, at ¾c per lb	3.79
78 hot water tanks, at 5c each	3.90
Other miscellaneous metals	39.64
12,865 pounds rags, at \$12 per ton	77.19
1,910 pounds rags, at \$13 per ton	12.41
33,875 pounds rags, at \$18 per ton	304.88
258,663 pounds rags, at \$18.50 per ton	2,392.62
20,560 pounds scrap iron, at \$7 per ton	71.96
98,044 pounds scrap iron, at \$5.60 per ton	274.53
16,111 pounds scrap iron (pier) at \$8 per ton	67.00
23,110 pounds scrap iron (pier) at \$8.10 per ton	95.90
105,754 pounds tin cans, at \$4.50 per ton	237.95
925,312 pounds waste paper, at \$5.60 per ton	2,559.47
3,982,594 pounds waste paper, at \$5.75 per ton	11,449.96

The WEEK'S NEWS

State Highway Events in Pennsylvania and Oregon—Baltimore's New Sewerage System—Pollution of the Great Lakes—The Philadelphia and Kansas Rate Cases—New White Ways in Cleveland, La Porte, Brockport, Syracuse and Racine—The Youngstown Riot—Citizens as Police in Chicago—Memphis Again—Change from Commission Form—Electrolysis Elimination—Smoke Abatement in Salt Lake City—Compensation by Cities in Michigan.

ROADS AND PAVEMENTS

Motor Vehicle Registration in Pennsylvania.

Harrisburg, Pa.—The state of Pennsylvania received \$1,665,276.50 for the registration and licensing of motor vehicles during 1915. At the close of business at the first day last week \$864,304 had been received by the automobile division of the State Highway Department for 1916 registrations and licenses. The applications are coming in in great numbers but the division is keeping up to the flood of applications and all registrations and licenses are sent out on the day on which they are received. The number of pneumatic tired motor vehicles licensed to that date for 1916 is 70,173, representing \$694,738. The sum received so far this year exceeds the total amount received from March 1, 1915 and is more than \$20,000 in excess of the total amount received by the state in 1913. The division has been so rushed with filling applications that it has not had time to make a tabular statement for 1916, but, the 70,173 licenses issued for pneumatic tired vehicles brought in \$694,738; the solid tired vehicles of the first class registered so far are 875, the amount received being \$4,375.00; those of the second class number 663, the amount being \$6,630.00; those of the third class number 2,879, the amount being \$43,185.00; those of the fourth class number 1,069, the amount being \$21,380.00; those of the fifth class number 751, the amount being \$18,775.00. Of tractors of the first class 98 have registered, bringing in \$480.00 and 2 of the second class, bringing in \$40.00. Of trailers of the first class 104 have been licensed so far, bringing in \$312.00; 1701 motorcycles added \$5,103 to the total and 17,849 drivers brought in \$35,698. Twelve drivers of tractors at a dollar a piece have been licensed while 3,341 dealers added \$33,410 to the total. Seventeen dealers in traction engines added \$74.00 and 92 transfers at a dollar a transfer brought the total for the year, at the close of business, on January 3, to \$864,304.

Decides Who Is Oregon Highway Engineer.

Salem, Ore.—In an opinion by Justice Bean, the supreme court holds that state engineer Lewis is state highway engineer under the consolidation measure, passed by the last legislature, thus ending the long controversy as to whether he or his chief deputy, E. I. Cantine, is entitled to have charge of the highway work in the state. The decision of the court turned on the provision of the consolidation law passed by the last legislature, providing that all highway work should be under the direct supervision of the deputy highway engineer, the court holding this provision invalid on the ground that it was in direct conflict with the title of the act. The decision apparently does not prevent the governor from appointing the chief deputy for Lewis, but it does take the power of appointing deputies from the chief deputy. Although Cantine, pursuant to an order made by the highway commission making him highway engineer and relieving Lewis of the duties, has served in such capacity since August, attorneys say his acts would not be illegal as he was de facto highway engineer.

Municipal Plant Talk Lowers Asphalt Prices.

Baltimore, Md.—Bids offered for asphalt street repairs next year indicate that the contractors of the city fear the installation of a municipal asphalt plant, and as a result proposals were made to the Board of Awards offering to supply next year's repairs for nearly one-half the figures

bid for this year's repair work. This year the Baltimore Asphalt Block and Tile Company had the contract for \$1.60 a square yard. The same company offered to do the work in 1916 for 84 cents a square yard. Several other companies also bid much lower than the price for which the repair work was done in 1915. This company has had the contract for several years and will probably get it again. The entire contract is worth about \$50,000, but before it is awarded the Board of Estimates, it is understood, will discuss the question of establishing a municipal asphalt plant. The lowest bidder offered to lay binder for 25 cents a square yard and topping for 59 cents a square yard, making a total of 84 cents a square yard.

The Lincoln Highway Through Philadelphia.

Philadelphia, Pa.—The official red, white and blue enameled signs, marking the route of the Lincoln highway in the city, have been placed by the Automobile Club of Philadelphia. A sign at Broad and Walnut streets, marking the westerly route of the road, is shown in the accompanying illustration. In placing the signs, the local club is following the lead of other automobile clubs throughout the country in co-operating with the Lincoln Highway Association.

Camden-Philadelphia Bridge Would Cost \$18,000,000.

Philadelphia, Pa.—That the construction of a bridge across the Delaware River, between Philadelphia and Camden, is perfectly feasible and could be carried out at a cost of about \$18,000,000, but that further study is necessary to determine whether the revenues and advantages would warrant the city's entering into an agreement to build such a structure, are the salient features in a report prepared by Chief Webster, of the Bureau of City Property, and presented to councils by Mayor Blankenburg at the end of his term. The report, in the form of a preliminary study, was prepared at the request of councils, made some time ago. In his report Chief Webster declared that there are a number of sources of revenue in sight, if such a bridge is built, and a number of advantages to the city. Traffic across the thoroughfare would provide one source of revenue, he explained. A bridge of the high-level type, with no piers in the river between pierhead lines, should be constructed, if the project materializes, he said. The cost of such a structure, including the damages, should be about \$18,000,000. No single location was recommended as imperative, on the basis of the study thus far made, but location plans and descriptions were presented to show the possibilities of a bridge on the axis of Market street, beginning at Sixth, or on Race, beginning at Fifth street.



Courtesy, Philadelphia (Pa.) North American.
THE LINCOLN HIGHWAY IN PHILADELPHIA.

SEWERAGE AND SANITATION

Mayor Accepts Baltimore's \$23,000,000 Gift.

Baltimore, Md.—Mayor Preston has accepted on behalf of the people of Baltimore one of the largest New Year's gifts ever presented the city. It is worth \$23,000,000 and required 10 years to construct. The gift is the city's new sewerage system. The Sewerage Commission will go out of existence on the first of February, having been allowed that much time in which to complete the details of its work. Mayor Preston in reply to the letter of Chairman England, of the commission, turning the system over to him, thanked and congratulated the commission for its work.

Scarlet Fever Cases Increase.

Omaha, Neb.—Fifteen new cases reported in twenty-four hours and thirty-three cases in a week, made the scarlet fever situation serious. The health office records show that the cases are spread over a wide area. An emergency hospital has been opened.

Diphtheria Epidemic.

New London, Conn.—Every necessary precaution has been taken against the spread of diphtheria or any other contagious disease, according to Mayor Ernest E. Rogers, and Dr. Carlisle F. Ferrin, medical examiner of schools in this city, who are handling the diphtheria situation. The cases are mostly of children, two and three years of age. Mayor Rogers, the health department and the school officials feel that there need be no serious apprehension on the part of anyone, as the cases are well in hand. A total of 16 cases has developed in the city.

WATER SUPPLY

International Commission Studies Water Pollution.

Detroit, Mich.—Members of the International Joint Commission held a three-day session in Detroit to investigate the pollution of the waters of the Great Lakes and connecting streams, wherein such pollution contravenes the treaty of 1909 between the United States and Great Britain, and matters growing out of the change of level of the waters of the Lake-of-the-Woods. The commission is composed of Charles A. Magrath, Harry A. Powell and P. B. Mignault, for Canada, and Senator Obediah Gardner, of Maine; Senator R. B. Glenn, of North Carolina, and former Congressman James A. Tawney, of Minnesota, for the United States. The bacteriological survey of the waters of the Great Lakes that has just been completed, though not yet fully compiled, is the most extensive work of the kind ever undertaken anywhere in the world. Twenty thousand samples of water have been taken. Thousands of acres in northern Minnesota, eastern Manitoba and Ontario and thousands of dollars of capital invested in power development projects are involved in the Lake-of-the-Woods problem. The commission meets with the power development interests in Winnipeg in February.

Huge Water Waste in Dallas.

Dallas, Tex.—Some time ago it was found that the city was collecting for only 34 per cent of the water actually pumped by the city pumping stations east of the river and for 50 per cent of the water pumped by the Oak Cliff station. Reading meters which have been set recently have disclosed that there are several hundred private families in Dallas using more than 25,000 gallons of water per month; more than 100 families using more than 50,000 gallons of water per month; scores of families using more than 100,000 gallons of water per month, and a few families using, or allowing to run to waste, as high as 250,000 gallons per month, and in one case a private family used and allowed to waste 280,400 gallons of water in thirty days. Had this last-named family been paying for water by meter instead of being on the flat-rate basis the water bill would have been \$45.50 in one month or \$182 per quarter.

It has actually been paying \$4 per quarter for water. A large number of city water inspectors were sent out to cut off arbitrarily services where water has been wasted, even though the consumers have paid in advance for the quarter. The city water ordinance prohibits waste even though the water has been paid for in advance. No notice is being sent to persons whose service will be discontinued. When the 7,500 new meters now installed were put in, they registered zero. Services were inspected at that time and people who had meters put in were told about any leaks that were found and asked to correct them. They signed blanks in which the leaks were pointed out, thereby having themselves put on record as being notified. Thirty days later the new meters were read, although the meter rates had not been put in operation. Householders again were notified of any leaks that had not been repaired. Another reading of the meters has been made, and it is in cases where the leaks were still allowed to go unchecked that the service will be discontinued until they are fixed. The new meters have also been given minute tests. Inspectors watched them for fifteen minutes. In some instances it was found water was running through them at the rate of a gallon per minute as a result of leaks.

Water Works Development in Kansas City, Kan.

Kansas City, Kan.—The municipal water plant has earned a net profit of \$335,335.25 above operating expenses in its six years of public ownership. The financial success of the city plant is shown in a report prepared by L. H. Chapman, Commissioner of Water and Lights. These earnings represent a 3 per cent annual income on a total investment of \$2,347,850, which the city has invested in its water plant. The old plant cost the city \$1,097,850, and it has taken thousands of dollars to replace some of the old equipment the city was forced to buy in order to make possible city ownership. Bonds to the amount of \$1,250,000 were issued to pay for these changes and to extend the water mains. Most of the improvements under these bond issues have been completed and the entire system will soon be in operation. Of the earnings \$202,297.13 is in the sinking fund to retire water bonds, \$70,000 already has been used to retire bonds and \$63,038.12 has been spent in making additional extensions. The bonds in the sinking fund are invested in city improvement bonds bearing 5 per cent. The water bonds bear 4½ per cent interest, making an annual interest profit to the sinking fund of approximately \$1,000 a year on the amount now invested in that fund. An amount equal to 2 per cent of the total investment is set aside each year for the sinking fund, with a special provision for paying off the last two bond issues, totaling \$350,000 a year at the rate of \$70,000 a year. This year the city has paid off \$100,000 worth of bonds and reduced the sinking fund only \$8,659.41, the balance being paid out of the earnings for the year. The Health Department records show the excellent work of the plant. In 1910 318 persons died of typhoid fever. There has been a gradual reduction in the disease since the day the city acquired the plant, with the result that only 25 persons have died of typhoid fever this year. Physicians of the city attributed the former typhoid fever rates to the impure water supplied by the old water company.

STREET LIGHTING AND POWER

Company Bought Obsolete Machinery.

Philadelphia, Pa.—Antiquated machinery, discarded long ago in other cities, is used by the Philadelphia Electric Company for lighting the city, according to testimony of Albert H. Manwaring, superintendent of arc lighting for the company, who was on the stand the first day of the resumed hearing before the public service commission of the Philadelphia rate case. He testified that the company since 1902 has purchased Brush arc generators of a type characterized as obsolete by ex-Director Cooke. These old machines, he declared, were purchased from electric companies of other cities, after they were unable to use them any longer, and from the local electric companies

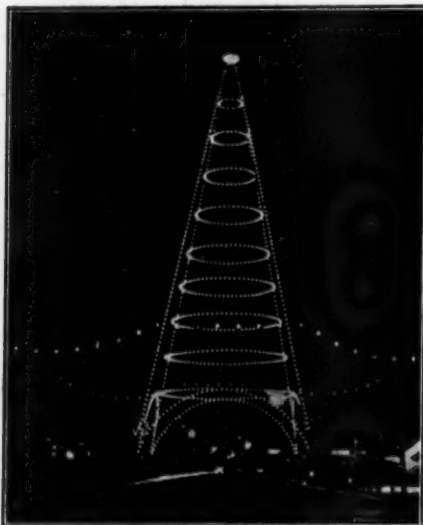
which the Philadelphia Electric Company absorbed fifteen years ago. The antiquated generators, he said, were purchased from fourteen cities, some of which were Wilmington, Allentown, Phoenixville, Jersey City, New York and places in Illinois and Canada. Mr. Manwaring submitted comparative figures on the cost of maintenance and efficiency of different lamps in an endeavor to refute statements made by former Chief Pike, of the electrical bureau, before the commission in Harrisburg some time ago. He attempted also to justify the retention in this city of the open-arc lamp. On the following day, Mr. Manwaring testified that Philadelphia cannot have the best illumination for its streets unless the present system of annual contracts is abandoned and the Philadelphia Electric Company, or whatever other corporation gets the job of lighting them, is given contracts of at least five years' duration. To replace the old generators, Mr. Manwaring declared, would entail an expenditure of approximately \$1,088,000, which is about the amount the company receives from the city annually for lighting the streets. This amount, it was shown, the company could not be justified in investing for new machinery without a guarantee against loss by a contract of reasonable duration. Under the present system, Mr. Manwaring stated, the corporation each year faces the possibility of some other corporation getting the contract and leaving the company with an expensive plant on its hands. Plans and specifications for placing the present equipment with up-to-date and improved machinery and appliances have been prepared by the company, he said, and if given a five-year contract they would be put into effect.

Municipal Plant Profitable.

Monroe, Mich.—Monroe's municipally owned electric lighting plant is earning a net profit of \$1,200 a month, according to a statement of W. G. Nicols, of Toledo, who has just completed an audit of the books of the concern. In addition, \$23,000 in improvements has been paid out of the earnings during the last two years, reports Mr. Nicols. The city purchased the plant in 1899.

City's Light Plant Profitable.

Baker, Ore.—Production of electricity in the city power plant during the year ending Nov. 30 will be shown to average \$0.0361 a kilowatt, according to a partial report by City Commissioner E. A. Whittier. Operation and maintenance for the year cost \$3,812; interest on bonds, \$1,250; sinking fund, \$875; and depreciation of plant, \$1,250; making a total expenditure of \$7,187.03, for an output of 198,840 kilowatt-hours. Improvements, consisting chiefly of the increase in the size of the penstock, cost an additional \$7,084.22. A balance of \$574.22 remains to the credit of the plant.



Courtesy, San Jose (Cal.) Mercury Herald.
SAN JOSE'S LIGHTING TOWER.

Big Lighting Tower Collapses.

San Jose, Cal.—The historic lighting tower at the corner of Market and Santa Clara streets collapsed suddenly leaving the 15-ton steel structure a complete wreck. The tower was built with money raised by public subscription in 1881. Last February it was seriously damaged by a heavy windstorm and following another campaign for public subscriptions, the contractor was at work strengthening and repairing the structure. The collapse occurred while work was under way, but the day of the accident was rainy and no workmen were out. Only one man was slightly injured and two automobiles had narrow escapes. The original tower cost \$3,500 and the contract for repairing amounted to \$6,100—\$4,000 of which will have to be paid for materials, labor and removal of debris. The tower marked the first use of electricity for street lighting in California.



Courtesy, San Jose (Cal.) Mercury Herald.
THE TOWER COLLAPSED.

City Need Not Buy Competing Plant.

Columbus, O.—Supreme court has declared invalid the statute which provides that a village must offer to buy an existing privately-owned gas or electric plant before erecting a municipal plant to compete. The home rule amendment adopted in 1912, applying to municipalities, repeals by inference the old statute, the court held. The decision was given in a case involving erection of a gas and electric plant at Orrville, where the Massillon Electric and Gas Company already had a plant. The private company stopped construction of the municipal plant by court procedure and later the Dravo-Doyle Company sued the village for collection on equipment which had been supplied for the municipal plant. This case reached the supreme court and was decided in favor of the Dravo-Doyle Company. The court's action is considered a victory for the municipality, however. The supreme court's decision is a reversal of the Wayne county court's judgments. Efforts were made during the last session of the legislature to repeal the old law requiring purchase of existing gas or electric plants in a village before construction of a municipal plant, but the proposed measure was killed.

Both Sides Attack Kansas Commission.

Topeka, Kans.—The receivers for the Kansas Natural Gas Company have gone into the United States Court here to attempt to remove the gas case from the jurisdiction of the Kansas Utilities Commission and to force the gas consumers of Missouri and Kansas to pay 37 cents a thousand cubic feet for natural gas for domestic purposes. The suit was brought against the Kansas Utilities Commission, the attorney general of Kansas, the Missouri Public Service Commission, the attorney general of Missouri, all of the distributing companies handling gas from the Kansas Natural lines, all the cities reached by the company, all the subsidiary corporations and the trustees for the various bondholders. Following this, Atchison City sought to enjoin the commission's act in setting aside franchise agreements with Kansas towns. The Shawnee county district court granted a restraining order against the commission and Joseph L. Bristow and his associates must now defend their order vacating franchise agreements in a number of towns of the state. The receivers' suit does not ask the court to enjoin the enforcement of the 28-cent gas rate ordered by the public utilities commission twenty days ago, until after the final hearing of the case in the courts. It is set out that the order of the Kansas commission is an interference with the property under the control of the receivers because the business of the Kansas Natural Gas Company is interstate commerce, and hence not subject to regulation by either state. It is also charged that the rates now fixed for natural gas are confiscatory, unremunerative, noncompensatory and seek to deprive the

company of its property without due process of law. Both states are brought into the suit because of the mutual interest of the people of Eastern Kansas and Western Missouri in natural gas. The Kansas commission has already fixed a rate at which it will permit gas to be sold in Kansas. The Missouri commission has announced, by its decision in the St. Joseph and in other rate cases, that it will not permit a higher rate to be charged in Missouri than is charged in the border towns of Kansas. The suit, being one attacking the jurisdiction of the commissions of a state and also attacking the laws of states, can be tried only before three federal judges, one of whom must be a judge of the United States Circuit Court of Appeals.

The Atchison case is based on the status of agreements between cities and companies which have been forbidden by the commission, particularly the clause regarding free gas for municipal purposes. The commissions order for a 28-cent gas rate cancelled this contract agreement and set aside franchise provisions in various towns. Gas companies, the Bristow commission recited, could not give away their gas and any and all previous contracts were held null and void. Suit filed by Walter E. Brown, as city attorney, and J. W. Orr, as special representative of the city of Atchison, asks that the Kansas commission be enjoined from the enforcement of its order. Following the filing of the Atchison suit the district court granted a temporary restraining order, holding in abeyance enforcement of the franchise provision of the gas ruling.

The double action was followed by a defective attempt on the part of the commission to keep the litigation out of the federal courts. The utilities commission asked the supreme court for an order restraining the further prosecution of gas suits before the United States supreme court. Because the supreme court recently decided that it had jurisdiction in the gas rate case, the commission has asked that the state tribunal protect that jurisdiction through the granting of an injunction.

New White Ways.

Cleveland, O.—Downtown Cleveland now has a great white way, the city's new ornamental lighting system having been completed. There were no special exercises for the opening of the lighting system. The system was to have been in operation September 1, but a strike of cable splicers employed by the lighting division held up work for a number of months.

La Porte, Ind.—In accordance with the contract made with the LaPorte Gas & Electric Company the old street lights have all been replaced by the new nitrogen-filled lamps. Besides all the old arc lights being replaced, 21 new lights were installed. The new lights cost the city \$57.50 each per year.

Brockport, N. Y.—The new ornamental lights on Main street are now in service. Several types of street lighting posts were submitted, the board finally deciding on a reinforced concrete standard, similar to those being used on a number of streets in Rochester. An 18-inch globe 11½ feet from the ground, supported by an iron capital, is mounted on this standard. All wires in connection with the new lighting system are placed in conduits under ground. The installation consists of 250 candlepower lamps spaced 120 feet apart and staggered.

Syracuse, N. Y.—Twelve new ornamental lights in James street have been placed in commission. They have the single instead of the five-light standard established in the business section. It is an experiment and if successful may result in the ornamental lighting of the entire James street section.

Racine, Wis.—Effective co-operation of the Sixth street Business Men's Club, the city council and the Wisconsin Gas & Electric Company, and the new white way on Sixth street was very quickly installed. The formal dedication was celebrated very enthusiastically. The system consists of eight Corinthian standards in each block. In all, there are forty posts, carrying 200 lamps. The standards are of corrugated cast iron, painted a dark green. The lamps are of the nitrogen-filled type.

FIRE AND POLICE

Riot and Fire.

East Youngstown, O.—Following wage disputes and a meeting of strikers kept out from a hall they had hired, an infuriated mob of several thousand strikers and sympathizers surged through the street, looting, burning and dynamiting. Mayor Cunningham swore in fifty deputies, but the crowds got entirely beyond control and the militia was ordered out. City Solicitor Oscar Diser and an armed body of citizens attempted to cow the mob by firing right into it. One was killed and over a hundred wounded in the fighting which ensued. Many whole business blocks were burned. The damage was estimated at exceeding \$1,500,000. The new lighting system in the principal street, just completed at a cost of \$60,000, was absolutely destroyed.

Disastrous Hotel Fire.

Waterbury, Conn.—One dead, six critically injured, many narrow escapes from death and damage estimated at close to \$150,000 are the results of a spectacular midnight fire that gutted the Hotel Connecticut. That the death list is not greater is due to the excellent quick work of the firemen and the presence of mind of several of the guests and employes of the hotel. The lack of ladders of sufficient height was the direct cause of six being injured. It is also said that there was some difficulty with hydrants as in the recent Buckingham street fire. Following a conference of Chief Henry H. Heitman with the mayor and the board of safety, special attention is to be paid to hydrant efficiency in the future.

Business Section Almost Wiped Out.

Gordonville, Va.—The business section of Gordonville, 75 miles west of Richmond, has been practically destroyed, the entire town being threatened by a midnight fire. Dynamite was used in an effort to check the flames until fire companies from Charlottesville and Orange could arrive on special trains in response to an urgent summons. Equipped only with hand reels the volunteer firemen at Gordonville were unable to cope with the blaze, which had gained great headway before being discovered.

Citizens to Report Crimes to Mayor.

Chicago, Ill.—Thousands of blanks have been ordered printed by the mayor, to be distributed at convenient points in every section of the city. Citizens, young and old, knowing of any violations of the ordinances, open saloons on Sundays or after hours, gambling houses, buffet flats or places where criminals congregate, are requested to fill out the blanks, swear to their charges before a notary public and forward them to the mayor's office where the city's chief executive will give them his personal attention. Complaints of laxity on the part of the police can also be made on the blanks provided for by the city. When violations of the law are pointed out by citizens and blanks are forwarded to the mayor the captain in command of the district will be notified. Failure on his part to remedy the evil will mean the filing of charges against him.

MOTOR VEHICLES

Fire Chief Liable for Truck Accident.

Rockford, Ill.—In the event that a verdict in the circuit court of Winnebago county is upheld against Frank E. Thomas, chief of the Rockford fire department, it is taken to mean that the motor-driven trucks of fire departments throughout the state are not to exceed the speed limit that is fixed by statute. A verdict of \$500 was given against Chief Thomas in a suit for damages of \$10,000, brought by the administrator of the estate of Baldassere Diverdi, who was killed when struck by the automobile driven by the chief in answering an alarm of fire. The chief is held personally responsible for the accident. Chief Thomas, blinded by dust from preceding fire apparatus, struck a pile of planks near the middle of the road, one of them flying through the air with sufficient force to kill Diverdi instantly. Chief Thomas was hurled a considerable

distance through the air at the time, landing on a grass plot near the side of the road, but being only slightly injured. Following the trial, Chief Thomas ordered all members of his department to obey the speed rules and motor apparatus is now going very slowly to fires. Leading citizens of Rockford are uniting to pay the entire sum of the verdict, unless the verdict is reversed. They expect to take early action for amending the statute exempting fire apparatus from observing the speed limit.

Chief Gets New Car.

Jacksonville, Fla.—The fire and standardization committees of the board of bond trustees has bought a new car for W. T. Haney, chief of the fire department. A Stutz was selected from the bids which were received some time ago.

New Chief's Car.

Pittsburg, Kan.—The fire chief's White car, purchased several months ago, has been received and "broken in." Chief Tom Howe was very well satisfied with the performance of the machine in a good road test. The car is a 30-horsepower roadster and carries a 35-gallon chemical tank, 200 feet of chemical hose, extinguishers and search-light.

Chief's Car From Funds Left Over.

Topeka, Kan.—When Mayor House discovered that there was \$2,000 left in the fund of the fire department the mayor decided to buy Chief Hanlon a new White car instead of turning the money back into the general fund for distribution among the different departments. The car now used by the chief will be turned over to Joe Waidelich, assistant chief. The two cars will be necessary after the first of the year when the double platoon system goes into effect.

GOVERNMENT AND FINANCE

Mayor Ousts Civil Service Commission.

Philadelphia, Pa.—Mayor Thomas B. Smith has summarily removed from office the entire municipal civil service commission and appointed a complete new set of commissioners in their stead. Robert M. Griffith, William H. Kreider and Nicholas Albrecht have assumed their official duties, succeeding Frank M. Riter, Peter Bolger and Lewis H. Van Dusen, the appointees of Mayor Blankenburg, who twice refused to resign when requested to do so by Mayor Smith. In a second statement in a reply to the mayor's request for their resignations, the former commissioners reiterated their previous declaration that to retire on demand would be in violation of the spirit of the act creating the board, and insisted that the mayor had no moral right to remove without cause.

Vote for New Charter.

St. Petersburg, Fla.—Voters of St. Petersburg carried the new city charter by a majority of 209. The new charter is a combined commission-councilmanic form with chief executive power in the hands of a commissioner of finance who resembles a city manager. The new charter is to take the place of the present commission form with three commissioners. The total vote cast in the election was 767, the largest vote ever cast in a city election here. Interest was intense, as the present city administration fought the new charter. Change in the form of government will be made July 1. St. Petersburg has had a commission form of government for three years.

Keep Ousted Officials from Office.

Memphis, Tenn.—E. H. Crump, former mayor of Memphis, and two other former city officials who were suspended from office November 3 on their "legal admission" of charges made in ouster proceedings, have been ordered by the state supreme court not to attempt to re-assume office, pending final determination of their appeal to the supreme court. The order was intended to forestall any possible attempt on the part of Mr. Crump or the other former officials, R. A. Utley, vice-mayor, and W. M. Stan-

ton, city judge, to enter upon second terms to which they were re-elected some months ago for four years, to begin January 1. The supreme court order directs that the temporary municipal government be maintained until the appeal is decided. In order to further insure protection from interference, Mayor George C. Love and W. J. Hayes, chief of police, obtained injunctions in the chancery court against the city commissioners.

New City Manager Appointed.

Webster City, Ia.—The new Webster City council, elected last October for the purpose of putting the "manager plan" of municipal government in force in this city, has just elected H. G. Vollmer as city manager. Mr. Vollmer comes from Burlington, where he was city engineer. The new city manager may be handicapped in his work for some time as there have been numerous dissensions in the city administration recently.

An Unusual Bond Legality.

Rome, Ga.—A novel question is raised in the Georgia courts by the filing of a suit in Floyd superior court against the city of Rome by Breed, Elliott & Harrison, a Cincinnati firm of brokers, for \$1,643.92. The firm was the successful bidder on bonds sold by the city last March, being the amount of the municipal building and hospital bonds. A few days after the bonds were ready for delivery, this city passed under the commission form of government and the bond buyers held that the securities should be signed by the commissioners instead of the mayor and council. As required by the terms of the bids, each firm bidding had to accompany its offer with a certified check for \$500. When the Cincinnati brokers declined to stand by their bid unless the bonds were signed by the commissioners, the city commissioners declared their certified check forfeited and it has never been returned to them but was cashed and turned into the city treasury. Then the bid of an Atlanta firm was accepted and they bought and paid for the bonds. The suit filed against the city is for \$1,643.92, as follows: Certified check, \$500; profit which would have accrued to the plaintiffs had they secured the bonds, \$1,043.40; expense of investigating their validity, \$100.52. The Cincinnati firm, when its attorney decided that the bonds should be signed by the city commissioners, had, they say, offered to pay for having new bonds engraved, to be so signed. The case will probably be heard this month.

RAPID TRANSIT

To Eliminate Electrolysis.

Springfield, Mass.—The Springfield street railway company will change its present system to the three-wire plan to eliminate electrolysis. This is in accordance with the recommendations of the Bureau of Standards at Washington, it is announced by President C. V. Wood. The work of making the changes will begin immediately. The decision to accept the recommendations of the Bureau of Standards was made following an extended study of the situation by the Stone & Webster engineering corporation, who agreed with the conclusions of the bureau. In discussing the new system Mr. Wood said: "Instead of sending current out from the power station to the trolley wire and returning it through the tracks and negative return, that is, making the trolley positive and the track negative, the trolley is split up into insulated sections, connected alternately with the positive and the negative side of the system. With this system the current is delivered from the power station to the positive sections of the trolley and returned through the negative sections of the trolley and the feeders to the power station. The main current does not return to the power station through the rail, the only current in the rail being from the rail in the positive trolley sections to the rail in the negative trolley sections, so that the only current returned to the power station through the rail would be a small one due to the load on the positive sections being

greater than the negative, or vice versa. The effect of this arrangement is much the same as would be obtained by a large number of small substations."

Jitney Law Re-passed.

Memphis, Tenn.—The jitney franchise ordinances have been passed by the board of city commissioners for the fourth time. Mayor Love for the fourth time voted against them. They granted to the Memphis Jitney Association, the North Memphis Traction Co., and the Rapid Transit Co., the right to operate jitneys on certain Memphis streets, over most of which the tracks of the Memphis Street Railway run. The courts will probably be called upon to test their validity, it being practically certain that the Street Railway Company will make the contention that its contract with the city has been broken, because of a loss of revenue which will result. Mayor Love will not sign the ordinances. They were passed over his "objection and veto."

Progress of New York's Rapid Transit System.

New York, N. Y.—This winter the new rapid transit work under the dual system contracts will reach high level. On December 1, the Public Service Commission had completed or under contract construction work on the new lines to be owned by the City of New York aggregating \$167,606,989.07. In addition, the Interborough Rapid Transit Company and the New York Municipal Railway Corporation, the two operating companies which entered into the dual system agreements with the city, had under way or completed construction work on third tracking and extensions of existing elevated railroads aggregating about \$15,000,000, making the total contracts to date upward of \$182,000,000. This work is shared by more than thirty separate contractors, who are employing a daily average of about 18,000 men. The dual system, city-owned lines are divided for convenience of construction and supervision into eighty-nine separate contract sections. At the present time contracts have been awarded for seventy-two sections, leaving only seventeen yet to be advertised. The engineers of the commission are completing the detailed plans for these sections and the greater part, if not all, will be ready for award within the next few months. The total cost of construction of city-owned lines is estimated at \$236,000,000, of which the city will supply about \$164,000,000, the Interborough Rapid Transit Company \$58,000,000, and the New York Municipal Railway Corporation \$14,000,000. It should, therefore, be borne in mind that the \$167,000,000 covered by contracts now outstanding, the city will supply only its quota, the balance being made up by contributions from the two companies in the proportion stated. The year 1915 has seen the completion and opening to traffic of some important parts of the dual system.

MISCELLANEOUS

Federal Collection of Birth Statistics.

Washington, D. C.—Director Sam. L. Rogers, of the Bureau of the Census, Department of Commerce, has recently inaugurated the collection annually of birth statistics within an area comprising the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut, New York, Pennsylvania, Michigan, and Minnesota, and the District of Columbia. This area, although it represents barely 10 per cent of the territorial extent of continental United States, has a population of approximately 31,150,000, or about 31 per cent of the total for the country. The collection of both birth and death statistics was authorized by the permanent census act, approved March 6, 1902. This act, however, provided that the statistics should be obtained only from the registration records of such States and municipalities as in the judgment of the Director of the Census possessed records affording satisfactory data in the necessary detail. Ever since the passage of this act the Census Bureau has made annual collections of mortality statistics from a steadily increasing area, which now contains about two-thirds of

the total population of the United States, but until recently very few of the States have maintained reliable birth-registration systems. A beginning has now been made in this country, however, and the statistics will relate to an area having a population of such size and heterogeneity as to render them of great value and significance. The data now being gathered will show birth rates for the population as a whole and for the white and colored races. Separate figures will also be given for urban and rural localities.

City Has No "Segregating" Power.

El Paso, Tex.—In reversing and remanding the case of Frank A. Spence et al. against W. H. Fenchler et al., from El Paso county, the supreme court held, in an opinion written by associate justice W. E. Hawkins that a city operating under a special charter has no right or power to designate a restricted or segregated district for vice purposes as the penal code operates against any such conditions. This decision affects other Texas cities similarly situated. This case is an appeal from the court of civil appeals at El Paso affirming an order of the district judge denying a temporary writ of injunction against alleged disorderly houses in El Paso, a city having a special charter.

Smoke Nuisance Greatly Abated.

Salt Lake City, Utah.—That the smoke nuisance has been abated 20 per cent in the business section and though Salt Lake has had a normal growth in 1915, the smoke nuisance on the whole has not increased, is the claim made by George W. Snow, chief of the bureau of mechanical inspection, in his annual report. Mr. Snow does not claim that there has been a reduction in the smoke of the residence and outside districts, but he asserts that there has been no increase in these districts, which, he contends, considering their growth, is equivalent to an improvement. The report insists that the ultimate solution to the smoke problem in Salt Lake will be centralized heating plants for both the business and the residence portions of the city. Mr. Snow declares that in this way only can permanent results be achieved, because of the expense attached to installing and operating smokeless heating apparatus in individual buildings or residences. Mr. Snow's report points out that the aim of his department has been to educate the people up to the point of smoke reduction, not to try to force them to do something that they probably could not be forced to do.

Cities Must Come Under Compensation Act.

Lansing, Mich.—Municipal corporations in Michigan must come under the workmen's compensation law, the supreme court has decided. Detroit questioned the state's right to force a municipal corporation under the compensation law and permit a private one to stay out if it so desired. Sault Ste. Marie insisted that the law made no provision for the paying of an award by a municipal corporation, nor did it supersede the city charter. Sault Ste. Marie, like Detroit, lost. In the Detroit case, a dependent of a city employe who was killed while working in the city lighting department, was awarded compensation. Justice Ostrander pays particular attention to the assertion of Detroit counsel that under the constitution of 1909 Detroit may enjoy the so-called private capacities granted to it, like a private corporation, and therefore in such activities as public lighting the city is a private corporation and not a municipal one. On this question Justice Ostrander says: "What has been called private in municipal activity is nevertheless public when contrasted with purely private enterprise and adventure. Municipal corporations are still state agencies and as such are subject to legislative direction and control, none the less so because the exercise of such control may indirectly affect a private municipal activity." In the Sault Ste. Marie case, William Purdy, a street sweeper, was run over while at work. The city asserted, unsuccessfully, that the charter was not superseded and that no provision was made for payment by the city.

LEGAL NEWS

A Summary and Notes of Recent Decisions— Rulings of Interest to Municipalities

Crossing Street—Care Required.

George Weidemann Brewing Co. v. Parmelee.—One who crosses a city street at any point other than a regular crossing is required to exercise a higher degree of care than where crossing at a regular crossing.—Court of Appeals of Kentucky, 180 S. W. R., 350.

Classification of City—Transition.

Murray v. State ex rel. Nestor.—A municipal corporation which had a population of less than 5,000 at the last Federal census did not advance to a city when it was made to appear or by an official census taken by the municipal corporation subsequently thereto that it had a population of more than 5,000.—Supreme Court of Ohio, 110 N. E. R., 471.

Municipal Corporation—Definition.

Sutter v. Milwaukee Board of Fire Underwriters.—A municipal corporation is a body corporate consisting of inhabitants of a designated area created by the Legislature with or without the consent of such inhabitants for governmental purposes possessing local legislative and administrative power, and power to exercise within such area so much of the administrative power of the state as may be delegated to it and possessing limited capacity to own and hold property, and to act in purveyance of public conveniences.—Supreme Court of Wisconsin, 155 N. W. R., 127.

Street Improvement Contract—Validity.

Atlantic Bitulithic Co. v. Town of Edgewood et al.—Though the estimated amount of work and material called for by such contract, at the stipulated prices per square yard, for the paving, and the stipulated prices per lineal foot for the curbing, etc., aggregates a sum in excess of such bonds and an amount beyond the constitutional limitation, yet the contract being partible, and susceptible of execution to the amount of such bonds and to the extent such municipality is permitted to become indebted, is void only as to the excess of work and material contracted for, and may be so enforced.—Supreme Court of Appeals of West Virginia, 87 S. E. R., 183.

Ordinance—Contract—Construction.

People ex rel. Dwight v. Chicago Rys. Co. et al.—A city ordinance embodying a contract between the municipality and street railways could be construed only in the light of its text, and not in the light of letters, statements, and opinions as to its meaning of members of the local transportation committee of the city council which it did not appear were brought to the attention of the council itself at large when the ordinance was submitted to it for passage, since it is the intention of the city council which the courts must endeavor to determine, not the intention of committee members, in construing an ordinance.—Supreme Court of Illinois, 110 N. E. R., 386.

Improvement Districts—Signatures of Husband and Wife—Joint Property.

McQueen v. City of Moscow et al.—Held, that the signature of both husband and wife is not required for the creation of an improvement district where they own and reside upon community property within the district, and that it is not necessary for both husband and wife to sign such petition where the real estate is owned by one of the parties as separate property where a homestead has been filed thereon; and held, that if the community property stands in the name of the wife it is not necessary for the husband to join in such petition, and that where the husband and wife own community property in such district and both sign the petition for the creation of the improvement district, they should only be counted as one; and, where one member of the community fails to sign such petition, the one signing should be counted.—Supreme Court of Idaho, 152 P. R., 799.

Legislative Control of Labor on Public Works.

Hein v. McCall.—The general power of a state over municipalities extends to regulating the kinds of laborers which may be employed in public works of such municipalities.—Supreme Court, 36 S. C. R., 78.

Action of Council—Building Effect—Informal Discussion.

Atlantic Bitulithic Cor. v. Town of Edgewood et al.—Informal discussion of a proposition at an informal meeting of the members of a municipal council, but on which no formal action is taken and no minute made, though there was a general understanding as to what should be done, does not constitute municipal action binding the municipality.—Supreme Court of Appeals of West Virginia, 87 S. E. R., 183.

Action Against Municipal Officers—Parties.

Anderson v. Bowen et al.—Where a citizen, taxpayer, and voter of a city, having only a public interest, brings a suit in equity against its municipal officers, attacking an act of the Legislature amending and re-enacting the charter of such city on the ground of its alleged unconstitutionality, and praying that such officers be enjoined from performing certain duties required by the act to be performed in order to put into operation, other citizens of such city, desiring to have such new charter put into operation, have a right to come into such suit by petition and make defense there.—Supreme Court of Appeals of West Virginia, 87 S. E. R., 186.

Ordinances—Validity—Indefiniteness—Nuisances.

City of Chicago v. Atwood.—A municipal ordinance prohibiting the installation in any building thereafter erected of certain kinds of water-closets, and providing that such closets, when found to be a nuisance, should be removed, was not invalid for indefiniteness, because of the failure to define the physical conditions which should constitute a nuisance, or state who should find the closets to be a nuisance, or who should remove them, as it was not necessary to define the physical conditions which should constitute a nuisance, the words "found to be a nuisance" did not require a judicial or official finding, but meant found, discovered, or perceived to be a nuisance by anyone affected by the nuisance, while the person who should remove the closet was necessarily the person who allowed it in the building and had authority to remove it.—Supreme Court of Illinois, 110 N. E. R., 127.

Assessments—Notice—Statutes.

People ex rel. Empie v. Smith, Mayor, et al.—Under Laws 1905, c. 593, revising the charter of the city of Johnston, and providing by section 124 that the cost of constructing sewers shall be defrayed fully by local assessment upon the property benefited, by section 125 that no expenditure for any local improvement to be paid by local assessment shall be incurred unless the common council declares its intention to make such improvement, by section 128 that after the council has declared its intention to make a local improvement it shall establish a district of assessment, and by section 129, containing special provisions as to sewers, that a resolution of intention to construct a sewer shall specify the points between which it is to be constructed, and that the city engineer shall prepare a map showing the property likely to be benefited, and file it with the city clerk, before the clerk shall publish or serve notice of its proposed construction, and section 130, providing that, if a district of sewer assessment has been established, the clerk, on the filing of the engineer's maps, etc., shall sign a notice of the proposed improvement, stating a time for the hearing of objections, which shall be published or served personally upon the owners, the special provisions are supplemental to the general provisions, and the contemplated procedure was the passage of a resolution of intention to make an assessment, the establishment of a district of assessment, the filing of maps, estimates, etc., and the giving of the prescribed notice, so that a notice published after the filing of the map and estimates, but before the assessment district was established, was premature, and invalidated the assessment.—Court of Appeals of New York, 110 N. E. R., 174.

THE MUNICIPAL INDEX

In Which Are Listed and Classified by Subjects All Articles Treating of Municipal Topics Which Have Appeared During the Past Month in the Leading Periodicals.

It is our purpose to give in the second issue of each month a list of all articles of any length or importance which have appeared in all the American periodicals and the leading English, French and German ones, dealing more or less directly with municipal matters. The index is kept up to date, and the month of literature covered each time will be brought up to within two or three days of publication. Our chief object in this is to keep our readers in touch with all the current literature on municipal matters. In furtherance of this we will furnish any of the articles listed in the index for the price named after each article, except that where an article is continued in two or three issues of the paper, the price given is for each of said issues. In addition to the titles where these are not sufficiently descriptive or where the article is of sufficient importance, a brief statement of its contents is added. The length also is given, and the name of the author when it is a contributed article.

ROADS AND PAVEMENTS.

Highways:

Rural Highways. Extracts from a paper before the International Engineering Congress relating to road problems—selection of type, construction of maintenance. By L. W. Page. 2,700 words. Canadian Engineer, December 16. 15 cts.

Highway Work in Los Angeles County, Calif. Describes organization and administration of department and gives types of roads most generally used and their construction; specifications; maintenance; bridges; traffic and accounting. 15 ills., 9,000 words. Good Roads, December 4. 10 cts.

The Parkdale-Cotopaxi Cut-off; A State Highway in Fremont County, Colorado. Tells how problems of location and grading in very rough country were solved. 11 ills., 1,000 words. Good Roads, December 4. 10 cts.

Pike's Peak Highway, Colorado. This is the first road to be constructed up Pike's Peak; toll road; scenic road of rare quality. By R. C. Hardman. 10 ills., 1,000 words. Engineering News, December 23. 15 cts.

Better Highway Specifications for Clearing and Grubbing. Defines grubbing and clearing and estimates shrinkage. By F. W. Harris. 1 ills., 1,500 words. Engineering News, December 23. 15 cts.

Maintenance:

Pavement Maintenance in Montclair. How a New Jersey town keeps old macadam roads in good condition under a heavy automobile traffic. Patching holes; skin coat to reduce wear; resurfacing with penetration macadam; patrol vs. gang system. 2 ills., 1,800 words. Municipal Journal, December 9. 10 cts.

The Maintenance of Pavements. Pavements grouped according to maintenance methods. From a paper by J. L. Bauer. 1,000 words. Canadian Engineer, December 30. 15 cts.

Methods of Resurfacing Old Roads. Discusses water-bound and bituminous macadam, bituminous concrete and sheet asphalt and vitrified or other block pavement and gives methods for each. From a paper by W. D. Uhler. 3,500 words. Engineering and Contracting, December 1. 10 cts.

Construction:

Transferring Paving Material from Cars to Pavement. A standard gauge railway was built alongside the new road. 4 ills., 1,000 words. Engineering News, December 9. 15 cts.

Large-Size Soft Stone for Bituminous Macadam Road. An innovation of the Ohio State Highway Department. 1 ills., 500 words. Engineering News, December 9. 15 cts.

Bank Street Pavement, Ottawa. Describes the interesting features of design and gives notes on material and construction. By L. McLaren Hunter. 9 ills., 1,500 words. Canadian Engineer, December 2. 15 cts.

Foundations for Pavements. Good foundations are desirable for gravel roads; preparing sub-grade and base for city pavements; repaving over trenches. 1,400 words. Municipal Journal, December 30. 10 cts.

Planning Board for Highway Contract Work, Philadelphia. Pins with colored heads are used to classify the work; appraises conditions of 750 contracts. By Wm. H. Connell. 6 ills., 2,000 words. Engineering Record, December 11. 15 cts.

Brick:

Brick Pavement Construction by Day Labor. Complete data concerning methods employed, amounts of material and labor used and itemized costs of three jobs by city forces in Carlisle, Pa. Time keeping system; saving estimated. By John C. Hiteshew, City Engineer. 4 ills., 5,000 words. Municipal Journal, December 30. 10 cts.

Concrete:

Coleman-Dupont Concrete Road. Extensive experiments were made with hy-

drated lime on this 20-mile section. Different kinds of reinforcement and methods of construction; expansion joints placed where work is suspended for more than 15 minutes and at irregular intervals. 4 ills., 1,400 words. Engineering News, December 30. 15 cts.

Hydrated Lime in Concrete Road Construction. A review of work done recently with hydrated lime in concrete pavement construction. 7 ills., 2,000 words. Good Roads, December 4. 10 cts.

General Description of Concrete Road Construction Methods in Wayne County, Michigan. Description of plan involving improvement of roads; method of hauling materials and distributing them along sub-grade. 2,500 words. Engineering and Contracting, December 22. 10 cts.

A Demonstration of Concrete Pavement Construction in Pennsylvania Highway Work. State Highway Department is demonstrating efficiency and economy of up-to-date methods of construction. 5 ills., 1,000 words. Good Roads, December 4. 10 cts.

Gravel:

Gravel Roads in New Hampshire; Patrol Maintenance. How some of the finest automobile roads in New England are kept in good condition under a traffic of 800 to 1,000 cars a day. 2 ills., 3,300 words. Engineering News, December 9. 15 cts.

Miscellaneous:

Methods and Results of Cost Recording on Pavement Work at St. Paul. 8 ills., 2,500 words. Engineering and Contracting, December 8. 10 cts.

A Simple Accounting System for Highway Maintenance. Developed by the Ohio State Highway Department. 1 ills., 900 words. Engineering News, December 30. 15 cts.

Location and Drainage of County Roads. Discusses technical considerations controlling the location of roads and bridges and in placing culverts. By Herbert Munn, County Highway Engineer, Portland, Oregon. 1,800 words. Pacific Builder and Engineer, December 25. 15 cts.

Present Condition of Second Avenue Test Pavements. A brief summary of one of the most extensive experiments with city street paving. By Henry W. Durham. 1,900 words. Engineering News, December 30. 15 cts.

Field for Highway Engineers. A discussion of necessity for highway development and importance therein of competent engineering. By F. A. Churchill. 1,200 words. Canadian Engineer, December 16. 15 cts.

Heavily Loaded Wheels on Highways. Gives the chord length, areas in contact and allowable weights per inch width of tire for steel or iron tires from one to seven feet in diameter. Also discusses the effect of rubber tires. By A. E. Collins. 1,250 words. Canadian Engineer, December 30. 15 cts.

SEWERAGE AND SANITATION.

Treatment:

Recent Results of Experiments on the Purification of Sewage by Aeration in the Presence of Activated Sludge at the University of Illinois. By Edward Bartow and F. W. Mohlman. Illinois State Water Survey. 4 ills., 4,500 words. Engineering and Contracting, December 1. 10 cts.

Activated-Sludge Experiments at Urbana, Ill. Describes the four tanks and reviews the operating results; fertilizer value of activated sludge. 2,250 words. Engineering News, December 2. 15 cts.

Disposal of Suspended Matter in Sewage. Abstracts from a paper before the International Engineering Congress, reviewing recent developments in sanitary collection, delivery and final disposal of sewage. By Rudolph Herling. 5,200 words. Canadian Engineer, December 2. 15 cts.

Sewage Treatment Works for Altamont. Y. W. C. A. Camp. Imhoff Tank, sprinkling filters, sand filters, and absorption ditches for a camp consisting of tents

and buildings, used four months in the year. By H. W. Taylor. 1 ills., 1,200 words. Engineering News, December 23. 15 cts.

Successful Application of Sewage Farming at Nottingham, England. Describes methods of handling the sewage and its value as a fertilizer; farm implements and machinery. 1,500 words. Engineering and Contracting, December 22. 10 cts.

Columbus Changes Sewage Tanks to Imhoff Type. Walls of the old tanks were retained; work of reconstruction. 3 ills., 1,000 words. Engineering Record, December 4. 10 cts.

Economic Possibilities of Sludge. Gives a review of experiments carried on at the experimental station of the Provincial Board of Health of Ontario. 1 ills., 1,250 words. Canadian Engineer, December 23. 15 cts.

Sewers:

West Toronto Storm Water Sewer Outlet. Gives a brief outline of the design and construction of the outlet into Lake Ontario of the new system for West Toronto. 3 ills., 1,200 words. Canadian Engineer, December 2. 15 cts.

Some Experiences With and Suggested Specifications for Vitrified Segment Block Sewers. Discusses advantages of segment block in sewer construction and describes methods of construction. 1,300 words. Engineering and Contracting, December 15. 10 cts.

Some Difficult Sewer Construction in Toronto. A description of the difficulties encountered and the general methods employed in the construction of the West Toronto storm water outlet. By W. C. Cameron. 9 ills., 2,700 words. Canadian Engineer, December 9. 15 cts.

Constructing a Large Concrete Sewer at Chicago. Constructing plant and methods for 11 to 16-ft. concrete sewer 10 miles long, from South Chicago through the Calumet district. 3 ills., 1,400 words. Engineering News, December 23. 15 cts.

Sewer Cleaning in Atlantic City. Windlasses and cables with metal scoop used for worst cases and poles for light deposits. Grease caused most of the stoppages. Amounts of grease and junk removed. By Frederick T. Parker. 5 ills., 2,000 words. Municipal Journal, December 16. 10 cts.

WATER SUPPLY.

Water Supply:

Water Supplies and Health in Massachusetts. Studies of hardness, color and corresponding typhoid, and general death rates seem to show that the hardness of the water has no effect on health, but that color is to some extent an indication of healthfulness of water supplies. By A. L. Gammage. 2,100 words. Engineering News, December 2. 15 cts.

Surface Water Investigation; U. S. Geological Survey. Government activity for past year, outlined by the head of this department. By J. C. Hoyt. 1,200 words. Engineering News, December 23. 15 cts.

Progress of Santa Barbara Water Supply Project. By K. Q. Volk. 600 words. Engineering News, December 2. 15 cts.

Purification:

Mechanical filtration plant at the Panama Exposition. Wooden filters prove economical for temporary water supply; operation data and costs. By E. C. Eaton. 6 ills., 3,000 words. Engineering Record, December 18. 15 cts.

Ultra-Violet Ray Sterilization of Water. Extracts from reports of Ontario Board of Health concerning exhaustive investigations in the application of this method. 11 ills., 5,500 words. Canadian Engineer, December 16. 15 cts.

A Comparison Between Bleach and Liquid Chlorine Disinfection. Gives results of experiments carried out in the laboratories of the Ontario Board of Health. By C. R. Avery. 3,000 words. Canadian Engineer, December 9. 15 cts.

Pressure Chamber Equalizes Wash Water Distribution at Miraflores Filters. False bottom with feed pipes to filter

bed replaces usual under drainage system involving ridge rocks and pipe manholes. Strainers were found to be unnecessary; population of 70,000 is supplied. By G. C. Bunker. 5 ills. 2,000 words. Engineering Record, December 25. 15 cts.

Pipes:

Results of Questionnaire on Life and Depreciation of Cast Iron Water Pipe in Fourteen Large American Cities. Lack of uniformity in writing off depreciation is conspicuous in replies to questions sent out by T. H. Hooper, Supt. of Water Works, Winnipeg. 2,600 words. Engineering and Contracting, December 15. 10 cts.

Laying Submerged Water Mains at Vancouver, B. C. Cast iron flexible joint pipes of 18-in. diameter were laid in 75 feet of water with a rapid tidal current. 4 ills. 1,500 words. Engineering News, December 30. 15 cts.

Overland Pipe Scheme, Ottawa. Some preliminary notes relating to the general scheme and equipment required. By L. McLaren Hunter. 6 ills. 1,200 words. Canadian Engineer, December 9. 15 cts.

Pumps:

Pointers for Comparing Types of Pumping Units. Reciprocating units familiar to employees. Architectural effect equalizes cost of buildings. Comparisons of two St. Louis pumps. By Geo. M. Peek. 1,200 words. Engineering News, December 30. 15 cts.

Reservoirs:

Concrete Lined Reservoirs, Salt Lake City, Utah. A 5,000,000-gallon reservoir lined with reinforced concrete without expansion joint. By S. Q. Cannon, City Engineer. 1 ills. 400 words. Engineering News, December 30. 15 cts.

Reconstruction of Reservoir at St. Louis, Mo. Lining a leaky reservoir embankment to make it water tight and increasing the depth and capacity by concrete wall around the top. 5 ills. 2,600 words. Engineering News, December 23. 15 cts.

Standpipes:

Building a 50,000-gallon concrete standpipe in 40 hrs. By Geo. H. Sampson. 3 ills. 900 words. Engineering News, December 23. 15 cts.

Design and Construction of World's Highest Reinforced Concrete Water Tower Tank, Middleboro, Mass. This structure has a capacity of 500,000 gals. The tank has a hemispherical bottom and is supported on a cylindrical tower. The total height is 172 feet. 6 ills. 3,000 words. Engineering and Contracting, December 22. 10 cts.

Miscellaneous:

Valuation of Water Works Property. The eighth in a series of articles on this subject by Halbert P. Gillette. This one gives a detailed appraisal of water works system supplying a city of 25,000. 7,000 words. Engineering & Contracting, December 1. 10 cts.

Some Intangible Values in Water Systems, with Special Reference to the Water Rights. Discusses the two principal intangible values in water works utilities: "Going Value" and "Water Right." 3,500 words. Engineering & Contracting, December 22. 10 cts.

Civil Service Examination for Water Works Engineers. Questions given to applicants for position in St. Paul. 600 words. Engineering News, December 2. 15 cts.

How to Take and Transport Samples of Water for Analysis. Describes the container, precautions to be observed in sampling, manner of shipment and outfit. 2,000 words. Engineering & Contracting, December 15. 10 cts.

Diplomacy in Collecting Water Bills at Terra Haute, Ind. Describes methods of sending letters and notices to delinquents. All collections are made by letter. 4 ills. 3,000 words. Engineering & Contracting, December 8. 10 cts.

A Low Concrete Dam at Harrisburg, Across Susquehanna River. A low dam of economical design. Precast concrete beams laid on buttresses for unner decking. By J. B. Justin. 7 ills. 2,700 words. Engineering News, December 30. 15 cts.

Columbus Water Works to Make Its Own Lime. By burning the lime carbonate precipitated in the water softening plant, sufficient lime will be obtained to operate the plant. Five thousand pounds of lime were recovered in the experimental kiln and used in plant. By Chas. P. Hoover, Chemist in Charge. 1 ills. 1,750 words. Municipal Journal, December 23. 10 cts.

STREET LIGHTING POSTS AND POWER.

Concrete Lighting Posts Made Attractive. Centrifugally molded columns used in Southern California. By L. W. R. All-

son. 4 ills. 500 words. Engineering News, December 2. 15 cts.

Desirability and Method of Connecting Low Voltage Secondary Electrical Currents to Water Pipes; Effect on the Pipe System. 5 ills. 6,500 words. Engineering & Contracting, December 29. 10 cts.

Steel Framing of Large Power Station. Describes the Essex generating station of the Newark Public Service Electric Company. 5 ills. 2,700 words. Engineering News, December 30. 15 cts.

FIRE.

San Francisco's New Fire Alarm Station. Three groups of circuits are provided with a fourth in reserve. Capacity for 130 circuits; method of operation and operating force. By James M. Barry, Chief, Dept. of Electricity. 4 ills. 3,500 words. Municipal Journal, December 2. 10 cts.

Fire Department Makes Motor Apparatus in Grand Rapids, Mich. Labor is performed by firemen under the direction of an expert mechanic. A combination hose and squad wagon was built. By Chester W. Shafer. 1 ills. 900 words. Municipal Journal, December 23. 10 cts.

STREET CLEANING AND REFUSE DISPOSAL.

Street Cleaning:

New York Street Cleaning. Fifteen hundred miles of streets are used by 100,000 horses and 50,000 automobiles. Itemized cost of cleaning and refuse collection. 2 ills. 2,800 words. Municipal Journal, December 2. 10 cts.

Refuse and Garbage:

Amounts of Garbage in Various Cities. Gives amounts as reported by many cities. Computed from tables in November 11th issue. 700 words. Municipal Journal, December 23. 10 cts.

Garbage Reduction in Columbus. General description of process; receipts from products average \$3 per ton of garbage; itemized cost and receipts. 1 ills. 2,000 words. Municipal Journal, December 2. 10 cts.

Garbage Disposal in Dayton. A plant is being constructed by the city for reduction of garbage. Estimate of cost of plant, of operating expenses and of revenue. By J. E. Barlow, Director of Public Service. 2,000 words. Municipal Journal, December 16. 10 cts.

Operating Results of the Palo Alto Refuse Incinerator. Cost data on the operation of a small-city incinerator having a capacity of 30 tons a day. 600 words. Engineering News, December 9. 15 cts.

Planning for Garbage Collection. How to determine number and capacity of vehicles to use, time required for collecting and relative costs under different conditions. Importance of unit value. 4,300 words. Municipal Journal, December 16. 10 cts.

Payment for Refuse Collection. Gives a synopsis of practices in more than 200 cities. Taken from information secured for November 11th issue. 2,000 words. Municipal Journal, December 30. 10 cts.

TRAFFIC AND TRANSPORTATION.

Making Motor Truck Pay on Short Hauls. Efficiency test of motor truck on short haul work produces record of 384 tons hauled in 8 hours. What a cartage company is doing in its city work. 7 ills. 2,000 words. Engineering Record, December 11. 15 cts.

Suggestions for the Use, Operation and Maintenance of Motor Trucks for Contractors. Hire best drivers, keep trucks in good repair, and provide for quick loading and unloading. 4 ills. 2,000 words. Engineering Record, December 11. 15 cts.

Electric Vehicles in Municipal Service. How they may be used economically in fire, police, street cleaning and other service. Illustrations of actual use. 1,400 words. Municipal Journal, December 23. 10 cts.

Tractors and Trailers in Municipal Work. Describes methods of increasing capacity and decreasing idle time of motor trucks by use of trailers. Examples of use in several cities are given. 7 ills. 2,700 words. Municipal Journal, December 9. 10 cts.

GOVERNMENT AND FINANCE.

Milwaukee Bureau of Municipal Research. Results of efforts to devise more efficient methods of operating several bureaus of the Department of Public Works. 1,200 words. Municipal Journal, December 16. 10 cts.

Trained Buyers Save Big Sums in City

Purchases of Supplies and Equipments. Describes economies possible under city manager administration. 1,500 words. Engineering Record, December 4. 10 cts.

Objects and Scope of the Proposed Civic Improvement League for Canada. Is an analysis of the Canadian situation to show the usefulness which such an organization would have in civic development of the future. From a paper by Thomas Adams. 2,500 words. Canadian Engineer, December 2. 15 cts.

Seattle Utilities Pay City for Sub-surface Maps. Taxpayers relieved from expense of underground surveys by charging cost to companies owning underground structures. By A. L. Valentine, Supt. Pub. Utilities. 2 ills. 1,200 words. Engineering Record, December 25. 15 cts.

Billboard Regulation. Court decisions in various states as to extent of municipality's power to regulate erection and maintenance of billboards on private property. By John Simpson. 3,000 words. Municipal Journal, December 23. 10 cts.

BRIDGES.

Some Data on Waterway Areas Required for Highway Bridges. Considers size, slope, and character of the drainage area, rainfall and run-off. Table gives waterway areas for different size drainage areas used by a number of railroads. From a paper by W. S. Gearhart, State Engineer of Kansas. 2,200 words. Engineering and Contracting, December 15. 10 cts.

Construction of Washington Street Arch Bridge at Indianapolis. Bridge is 844 ft. long, with 7 arches. Description of foundation work, and two concreting plants. 1 ills. 2,200 words. Engineering News, December 9. 15 cts.

A 2,223-ft. Concrete Arch Bridge Built on a Reverse Curve. The Third Avenue bridge across the Mississippi river at Minneapolis contains arch spans 211 ft. long. 7 ills. 4,300 words. Engineering News, December 30. 15 cts.

Three-hinge Arch Girders with Vertical Ends Provide Barge Canal Clearance. Special design was required in street crossing at Lockport. 3 ills. 1,200 words. Engineering Record, December 4. 10 cts.

Lemieux Island Bridge, Ottawa. Details of a 4-span reinforced concrete arch bridge carrying water main of overland fire pressure system. By L. McLaren Hunter. 4 ills. 1,000 words. Canadian Engineer, December 23. 15 cts.

Detroit-Superior 591-Foot Steel Arch Successfully Swung by Toggle Adjustment. Timber travelers erect a three-hinged arch span and double deck floor for Cleveland bridge. 4 ills. 1,500 words. Engineering Record, December 25. 15 cts.

Concrete Cantilever Trusses Support Large Pipe Line. Bridge 2,424 feet long carries a sewer across river in Australia; foot path. 3 ills. 600 words. Engineering Record, December 4. 10 cts.

Bloor Street Viaduct, Construction, Toronto. Gives an outline of the progress made during the past year on the two large steel and concrete bridges. 9 ills. 1,750 words. Canadian Engineer, December 16. 15 cts.

MATERIALS OF CONSTRUCTION.

Materials vs. Methods—Testimony of Moving Pictures in the Study of Concrete. A series of three articles on the making of better concrete. Part 1, on mixing, suggests the necessary function of a concrete mixture and points out the evils of the short mixing period. 5 ills. 3,000 words. Part 2 discusses the abuses common in the handling of sloppy wet mixtures. 10 ills. 2,700 words. Part 3, pictures show reasons for lack of homogeneity in finished mass. Entrained air weakens concrete dropped from height into forms. 11 ills. 2,500 words. By Nathan C. Johnson. Engineering Record, December 4, 11, 18. 10 cts.

Shrinkage and Time Effects in Reinforced Concrete. Summary of tests and other investigations for the determination of the above and for a study of their possible results. 1,200 words. Canadian Engineer, December 2. 15 cts.

Mortar and Concrete. Strength as dependent upon sand and stone as upon cement used. Gradation of aggregates. Machine mixing preferable to hand mixing. 1,600 words. Municipal Journal, December 9. 10 cts.

Making Concrete Tight, Tacoma and Seattle Water Works. At Tacoma, repairing a leaky reservoir lining; waterproofing the concrete, with particular attention to the joints; waterproofing concrete for settling well and conduit. At Seattle, concrete was not waterproofed.

(Continued on page 58.)

NEWS OF THE SOCIETIES

Calendar of Meetings.

Jan. 12-15.—AMERICAN INSTITUTE OF CHEMICAL ENGINEERS. Annual meeting, Baltimore, Md.

Jan. 17-19.—MONTANA INSTITUTE OF MUNICIPAL ENGINEERS. Annual meeting, Billings, Mont. Secretary and treasurer, C. C. Widener, Bozeman, Mont.

Jan. 19, 20.—COLORADO GOOD ROADS ASSOCIATION. Sixth annual convention, Denver, Colo.

Feb. 2-5.—INDIANA ENGINEERING SOCIETY and the INDIANA WATER SUPPLY AND SANITARY ASSOCIATION. Annual convention, Claypool Hotel, Indianapolis, Ind. Secretary, Chas. Brossman, 1616 Merchants' Bank Building, Indianapolis, Ind.

Feb. 4, 5.—AMERICAN ELECTRIC RAILWAY ASSOCIATION. Seventh annual midyear meeting, Chicago, Ill.

Feb. 10-12.—MINNESOTA SURVEYORS' AND ENGINEERS' SOCIETY. Annual meeting, St. Paul.

Feb. 12-19.—NINTH CHICAGO CEMENT SHOW. First Infantry Armory and Coliseum, Chicago, Ill. Secretary, Robert F. Hall, Cement Products Exhibition Co., 208 South LaSalle street.

Feb. 15-18.—SECOND NATIONAL CONFERENCE ON CONCRETE ROAD BUILDING. Secretary, J. P. Beck, 208 S. LaSalle St., Chicago, Ill.

Feb. 17, 18.—AMERICAN CONCRETE PIPE ASSOCIATION. Annual convention, Chicago, Ill.

Feb. 28-March 3.—AMERICAN ROAD BUILDERS' ASSOCIATION. Thirteenth annual convention, including sixth American Good Roads Congress and seventh National Good Roads Show of Machinery and Materials, Pittsburgh, Pa.

Feb. 29-March 4.—TENTH ANNUAL MID-WEST CEMENT SHOW, Omaha, Neb.

May 8-10.—SOUTHWESTERN WATER WORKS ASSOCIATION. Annual convention, Waco, Tex. Secretary, E. L. Fulkerson, Waco, Tex.

May 10-17.—NATIONAL CONFERENCE OF CHARITIES AND CORRECTIONS. Annual conference, Indianapolis, Ind.

June 4-8.—AMERICAN WATER WORKS ASSOCIATION. Thirty-sixth annual convention, New York, N. Y. Secretary, J. M. Diven, 47 State Street, Troy, N. Y.

June 15, 16.—OHIO SOCIETY OF MECHANICAL, STEAM AND ELECTRICAL ENGINEERS. Convention, Cleveland, O. President, Joseph L. Skeldon, Toledo.

Sept. 6-9.—LEAGUE OF AMERICAN MUNICIPALITIES. Annual convention, Newark, N. J.

Pan-American Scientific Congress.

The Pan-American Scientific Congress, with delegates from all of the 21 American republics attending, was held at Washington, D. C., December 25 to January 8. In addition to the congress, which was divided into nine groups, the following organizations, affiliated directly or indirectly with the congress, were present and held meetings.

The American Historical Association, International Congress of Americanists, American Economic Association, American Political Science Association, American Society of International Law, Naval History Society, American History Society, American Statistical Association, American Sociological Society, American Association for Labor Legislation, American Folk Lore Society, American Anthropological Association, Archeological Institute of America, American Civic Association and the Association of American Geographers.

Many papers and addresses were presented at the various sessions of the Congress. Among them were the following:

Addressing subsection 6 of the section of the general congress devoted to education, Prof. William H. Burr, of Columbia University, spoke on "The Relative Importance of General Training in Engineering Branches to Extreme Specialization."

Mr. Burr said in part:

"A special field of engineering is related in many ways to other fields, and advances in any one of them affect frequently to a material extent the interests of others. An intending specialist, therefore, should receive general educational training in engineering as far as fundamentals are concerned.

"The present demand is toward a broader and more general engineering training on which to base specializations—i.e., to decrease excessive drill in mere computations and laboratory manipulations and devote more time to fundamental matters or general principles, so that the final specialization may be less narrow and more effective. In such educational work there would still be ample opportunities for legitimate computation and design work of a general character and of laboratory work suitable to illustrate general principles and the attainment of such full technical information and practice as may properly be reached in the professional school."

Dr. Charles S. Howe, of Cleveland, Ohio, spoke on the subject "Engineering Education in the United States." He said in part:

"Engineering education is an outgrowth of the idea that anything can be taught in a school. Engineering, like other professions, was learned at first by practicing with some one skilled in the profession.

"In the United States there were a few engineering schools before 1862, but they were small and ill-equipped. The Morrill act, passed by the United States Congress in 1862, conferred certain lands upon the states for the purpose of establishing universities in which should be taught, among other things, agriculture and the mechanic arts. In consequence of this act, state universities having schools of agriculture and schools of engineering have been established in nearly all the states, and many of the older colleges have established engineering courses; a few independent schools have also been developed.

"Most of the engineering colleges receive their students from the high schools, although now a few of our universities have graduate courses only. Some will not take students until they have finished a college course having a few engineering electives as a part of it.

"The primary object of these schools

is to turn out men who understand the laws of nature and the use of materials so they can devise methods and supervise work in railroads, manufacturing establishments, structures, mining and chemical manufacturing. The education which they give would be incomplete if it did not also train men in character and for good citizenship. These objects must be accomplished somewhat indirectly, but the whole training in the engineering schools tends to make men broad-minded and to train them to take an interest in the communities in which they live."

"Facts pertaining to health, in order to be socially useful, must be made an integral part of the individual consciousness and conscience," said Dr. William C. Woodward, health officer of the District of Columbia, addressing the section on public health and medical science.

"This can be done only through education," he continued. "It is the duty of the government to provide such education, through agencies established for the purpose, through school and college curricula, bulletins, pamphlets, newspaper articles, lectures and exhibits. It is necessary, too, that the government set an example with respect to hygiene and sanitation in the management of all its own affairs, such as in city planning, housing schemes, water supplies, refuse disposal systems of all kinds, and the construction and management of public buildings. Laws for the protection and promotion of public health must necessarily be enforced by punitive measures, but such laws and such punitive action must be looked upon as primarily educational, influencing the future conduct of the person punished and that of the persons for whom he may serve as an example."

Philip Torchio, electrical engineer of New York, delivered an illustrated address on industrial applications of electricity before the engineering section, in which he said that manufacturers of the United States now use over 11,000,000 horsepower of electric power annually.

"Adding the central stations and the street and electric railways, and, say 2,000,000 horsepower of electric power from the other classifications," Mr. Torchio said, "we obtain a total of 25,000,000 horsepower used in the form of electricity in the United States, or, in other words, one-sixth of all the primary power used in this country."

"The city of Washington has good shade trees because the entire city has been developed according to a well-defined plan. Provisions are made for trees as an element in the civic art of the city."

This statement was made by Prof. Henry R. Francis, of Syracuse, N. Y., in an address on "How New York Educates Its People Through the Landscape Extension Service," delivered at the concluding session of the eleventh annual convention of the American Civic Association held in conjunction with the congress.

"In a like manner," said Prof. Fran-

cis, "we must approach every tree planting proposition from a landscape standpoint. It is absolutely essential, if we shall have good shade trees, that these trees be planted with due consideration of their relation to the surroundings now and twenty-five years from now.

"Civic art is gradually finding its way into the rural districts. I say 'gradually' because in such places as our cities, where considerable attention has been turned to civic art, it has made really just a start."

Rural planning, which shall do for the great stretches of the open country what city planning has done to preserve and extend the beauty of urban and suburban communities, was put forward, by Prof. Frank A. Waugh, of the Massachusetts Agricultural College, as a new and urgent need in civic development.

Richer than the city in possibilities for development along lines of beauty, sanitation and wholesomeness, said Prof. Waugh, the country has been largely neglected and allowed to grow in a haphazard manner. Country people, he declared, are living in uncomfortable and inconvenient houses, are using unsightly and inefficient roads and schools and are dying of tuberculosis because there has not been adequate planning to make the best use of country resources.

The construction by the federal government of a system of highway trunk units connecting all major cities and forming a network of good roads throughout the country was advocated by Cyrus Kehr, of Knoxville, Tenn., in an address on "A National System of Highways." The development of such a system is needed, said Mr. Kehr, to supply civil, commercial, military and recreational needs. Mr. Kehr suggested a system of local communicating roads as auxiliaries to the system to the major roads, which, he said, would carry at least three-fourths of all the highway traffic outside the cities.

President J. Horace McFarland announced the appointment of chairmen of several committees that will direct important activities during the coming year, as follows:

National parks, Enos Mills, Estes Park, Colo.; state and county parks, Dr. John Nolen, Cambridge, Mass.; schools as community centers, Miss Margaret Wilson, Washington, D. C.; city planning, Lee J. Ninde, Fort Wayne, Ind.; committee on noise nuisance, Mrs. Imogen B. Oakley, Philadelphia, Pa.; markets, Mrs. Elmer E. Black, New York City; country planning, Prof. Frank A. Waugh, Amherst, Mass., and billboards, J. Horace McFarland, Harrisburg, Pa.

"Machinery was never better housed, working conditions for the men better planned or the surroundings of the factories more attractively arranged, but when you leave the factories and go into the homes of the workingmen you find poorly built and inflammable houses crowded together in squalid

surroundings," said Perry R. MacNeille, of New York City, in an address on "Industrial Town Development," delivered at the session devoted to "Better Industrial Housing." "The neglect of employees' home conditions is not confined to the war-made towns," he said, "but is even more marked in such cities as Pittsburgh, and is noticeable throughout the country."

The subject also was discussed in a paper on "Planning for Mushroom Industries," by Dr. Caroline Hedger, of the national Americanization committee, New York City; and by Lawrence Veiller, secretary of the National Housing Association, New York City, whose subject was "Housing Safeguards." Both emphasized the need for careful planning and adequate financing, and directed attention to the numerous ills of society traceable to unwholesome housing conditions.

Questions of the needs of small urban communities were presented at the afternoon session by Edwin T. Fiske, mayor of Mount Vernon, N. Y., in a paper on "The Practical Problems of City Planning for the Small City." The topic was discussed by Dr. John Nolen, of Cambridge, Mass.; Thomas Adams, town planning adviser to the commission of conservation, Ottawa, Canada; Frederick Law Olmstead, Brookline, Mass., and Dr. Werner Hegemann, of Berlin, Germany.

Mayor Fiske said there is a large amount of literature in existence in regard to city planning, but that the greater part of it deals with large urban centers, and is useless to the small city.

"One serious problem which we probably share with many other cities," he said, "is the development of isolated

sections by real estate speculators. These sections, usually outside the control of the city, are mapped out according to plans of the owners of the property. The location and width of the streets, the pavement, lighting and sanitation are all done according to plans which for the time being cannot be controlled by the city. When later the section is taken over these conditions need to be brought in harmony with the plans followed in the rest of the city."

The final session of the congress was held Saturday morning, January 8, although a banquet was given that night. After outlining the purpose of the congress, thirty-six resolutions of the most comprehensive character were adopted, taking up every subject which has been and is of interest to the American republics. Among them were:

The American republics undertake as soon as possible:

(a) Accurate geodetic measurements which may serve to determine the limits, national and international, and to contribute to the discovery of the true shape of our planet.

(b) Magnetic measurements of their respective surfaces and the establishment of several permanent magnetic observatories.

(c) To extend their gravimetric measures (obtained by means of the pendulum) to those regions where these measurements may not have been taken.

That the nations of the American continent establish by means of their offices of geodesy or by committees appointed for that purpose an international triangulation.

That the governments of American nations reach an agreement for the purpose of creating an office or congress of cartography and geography.

That proper steps and measures be taken to bring about in the American republics participating in the congress a general use of the metric system of weights and measures.

Confirms the resolution recommended to the American republics by the first Pan-American Scientific Congress regarding the installation of meteorological organizations to serve as a basis for the establishment of the Pan-American meteorological service.

That there be appointed an international Pan-American committee, to study and report upon the question of establishing such a uniform railway gauge as will best serve the countries' interest, their international communication and the communication between all the countries of America.

The appointment of an American committee on radio communication, to assist in development of the science and art of radio communication.

That through the governmental agencies of the American republics a co-operative study of forest conditions and forest utilization be undertaken and that the data thereon be published.

That each of the American nations

MUNICIPAL INDEX

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but the joints were asphalted. Subsequent leakage was stopped by replacing some of the asphalt with a harder grade of material. By C. E. Fowler. 3 ills. 1,100 words. Engineering News, December 2. 15 cts.

Sand and Gravel Washing and Grading Plant. Described an elaborate plant served by a drag line and scraper. By C. B. Breed. 3 ills. 1,500 words. Engineering News, December 23. 15 cts.

MISCELLANEOUS.

Care of Municipal Horses. Description of methods used in Department of Street Cleaning, New York City. 800 words. Municipal Journal, December 30. 10 cts.

Municipal Inspection in New York. Organization of inspecting force; instruction to inspectors; specifications; carefully drawn and strictly enforced; co-operation with contractors. From a paper by Felix Kleeberg, Chemist, Dept. Public Works, Borough of Manhattan. 3,500 words. Municipal Journal, December 30. 10 cts.

Suggestion as to Technical Files for Engineers. Should be small, up-to-date and easily kept. By L. B. Krause. 200 words. Engineering Record, December 18. 15 cts.

Chicago Smoke-Abatement Committee Report on Electrification. Expenditure of \$275,000,000 to abate 22 per cent of visible smoke is considered unwarranted. 22 ills. 5,000 words. Engineering Record, December 11. 15 cts.

Revere Beach Rampway. Reinforced concrete work done by the Metropolitan Park Commission of Boston; form construction; materials and appliances used. By W. B. Conant. 2 ills. 1,000 words. Municipal Journal, December 23. 10 cts.

appoint a commission to investigate and study in their respective countries the existing laws and regulations affecting:

(a) The administrative practice of regulating the use of water.

(b) The adjudicating of rights pertaining to the use of surface and underground water for irrigation purposes.

(c) The distribution, application and use of water upon arid and irrigable lands.

(b) Methods of conservation of surface and underground waters for irrigation or industrial purposes.

(e) And to suggest laws or regulations in the interest of general industry, navigation and commerce.

That the question of the reclamation of arid lands is one that should receive the immediate and careful consideration of the several governments of the American states.

To petition the governments of the American republics that they further the interchange of educators of all grades, and of students of university, normal and technical training, encouraging both to make visits of instruction to other American countries.

That all American countries inaugurate a well-considered plan of malarial eradication and control based upon the recognition of the principle that the disease is preventable to a much larger degree than has thus far been achieved.

That the American republics in which yellow fever prevails, or is suspected of prevailing, are urged to enact such laws for the eradication of yellow fever as will best accomplish that result.

That it is desirable to make a scientific study of the systems of taxation existing in the different American republics.

That the American governments, deriving important revenues from the consumption of alcohol, should organize their systems of taxation so that the economic interests be subordinated to the higher interests of a social and moral order, which tend to the suppression of alcoholism.

That it is advisable that the different monetary systems of the American republics be studied from a scientific point of view and in connection with the experience of the various American countries in such matters.

That the American republics make uniform, as far as possible, the basis, and adopt a common time for the taking of the census, and adopt uniform principles in commercial and demographic statistics.

Association of Engineering Societies.

The Journal of the Association of Engineering Societies will be discontinued with the December, 1915, issue, owing to the disbanding of the association on December 31, 1915. The Engineers' Club of St. Louis, the largest society in the association and its active

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PERSONALS

Brown, John M., Mayor of Stamford, Conn., died Dec. 11, after a short illness, aged 60.

Burrell, Frank E., former Chief of Police of Quincy, Mass., died at his home in that city Dec. 9.

Charles, Salem D., chairman of the Boston Board of Street Commissioners, died at Boston, Dec. 9, after an illness of about one year.

Groves, Robert, has been appointed Supervisor of Police of Ridgewood, N. J.

McEwan, James Briggs, a former Mayor and Postmaster of Albany and a former Assemblyman and State Senator, died December 27. He was born in Albany and was graduated from Yale University in the class of 1878, of which former President Taft was a member. From 1897 to 1901 he was a member of the Assembly, and then was elected to the Senate, where he served until 1907.

Mitchell, S. W., has been appointed county engineer of Tulsa County, Oklahoma.

Tepel, F. W., has been appointed Chief of Police of Williamsport, Pa.

Adler, L. E., of Brunswick, Md., has been appointed engineer in charge of the repairs to the Shepperdstown dam.

Barton, L. H., has been appointed to fill the vacancy in the Glasgow, Ky., council caused by the death of E. P. Barlow.

Bigbee, C. A., has been appointed Service Director of Newark, O., by his father, Mayor R. C. Bigbee.

Brown, Elmer, has been promoted to the position of second assistant chief of the Binghamton Fire Department.

Browning, T. E., has been appointed Chief of Police of Ogden, Utah, succeeding W. I. Norton.

Burkholder, Frank, has been appointed Service Director and A. C. Thorton, Safety Director, of Troy, O.

Carr, Ossian E., has been appointed city manager of Niagara Falls, N. Y. He formerly was city manager of Cadillac, Mich.

Cheatham, H. P., has resigned as Chief of the Carlisle, Ky., Fire Department and J. J. Archdeacon has been appointed to succeed him.

Falvey, A. T., has been appointed chief of police of Bridgewater, Mass.

Albright, Chester E., has been appointed Chief of the Bureau of Surveys of Philadelphia.

Quinn, George W., has been re-elected road supervisor of the Dryad Good Roads Association, Centralia, Wash.

North, Carl, has been elected Chief of the Punxsutawney, Pa., Fire Department.

Regan, Michael, for 30 years a member of the Buffalo, N. Y., Police Department and for the last ten years superintendent, has resigned.

Ransom, T. W., has resigned as consulting mechanical engineer of the Board of Works of San Francisco.

Raymond, Robert Matthews, a prominent mining engineer, has been ap-

pointed professor of mining in the Columbia University Graduate School of Mines. Professor Raymond was born in Fredericton, New Brunswick, Canada, received his A.B. from New Brunswick University and his mining engineering degree from the Columbia School of Mines in 1889. After teaching in the Fredericton schools, Professor Raymond for two years was assistant assayer in the state of Maine Assay Office, and after graduating from the Columbia School of Mines held a number of important posts in mining companies.

The following have been elected in Washington:

Colville—Mayor, W. L. Sax; clerk, J. C. Hard; councilman-at-large, Dan Droz; councilman, 1st ward, E. C. Connor; 2d ward, J. Artman; 3d ward, J. J. English.

Tekoa—Mayor, C. J. Blair; clerk, Ira A. Snyder; councilman-at-large, I. S. Woods; councilman, 1st ward, E. R. Jones; 2d ward, G. B. Grant, L. H. Noyes; 3d ward, W. A. Dittmer.

Kennewick—Mayor, L. E. Johnson; clerk, Mrs. M. E. Soth; councilman-at-large, H. A. Bier; councilman, 1st ward, Charles Haas; 2d ward, George Tweed; 3d ward, George Edbert.

Connell—Mayor, F. W. Nelson.

Sprague—Mayor, Mathew Brislawn; councilmen for three years, J. C. Williams, Victor Hertrich, C. S. Brown; councilman for one year, John Kleba; councilman-at-large, E. A. Child; clerk, J. F. Hall.

Toppenish—Mayor, W. L. Shearer; clerk, C. A. Wyckoff; councilman-at-large, E. L. Doran; councilmen, 1st ward, Colman Rosenstein, Dan Ethier; 2d ward, G. C. Seefeldt.

Prosser—Mayor, A. De Y. Green; clerk, J. G. Boyle; councilman-at-large, J. W. Whiting; councilman, 1st ward, Hugh Forsythe; 2d ward, W. E. Shrader; 3d ward, Bert Mahan.

Cheney—Mayor, L. C. Van Patten; clerk, J. P. Lasher; councilmen, J. E. Whalen, Cris Garberg, A. J. Porter, G. A. Fellows, Clarence D. Martin.

Waterville—Mayor, W. A. Henry; councilmen for two years, M. E. Leis, J. H. Winstanley, M. H. Davison; councilman for one year, Del Lytle.

Ephrata—Councilman for one year, T. J. Cook; councilmen for two years, C. T. Sanders, H. D. McMillen, Charles Duncan.

Deer Park—Councilman for one year, R. R. Groce; councilmen for two years, J. A. Jump, Charles Martin.

Leavenworth—Mayor, N. B. Day; clerk, A. R. Brown; attorney, L. J. Nelson; councilmen, W. L. Hale, P. A. Snyder, J. M. Miller, George Kuggelman.

Pasco—Mayor, Edward A. Davis; clerk, C. A. Dolan; councilmen, three years, W. F. Chute, L. L. Holt, W. A. Harrison; councilman, one year, Frank L. Steckel; councilman-at-large, R. F. Falk.

Colfax—Mayor, F. B. Rogers; clerk, T. J. Welty; councilman-at-large, Patrick Codd; councilman, 1st ward, C. B.

(Continued on page 62.)

NEW APPLIANCES

Describing New Machinery, Apparatus, Materials and Methods and Recent Interesting Installations.

A NEW TRUCK.

Worm Drive $\frac{3}{4}$ to 1-Ton Machine of New Design.

In its new line of seven chassis sizes of commercial vehicles for 1916, the Kissel Motor Car Company of Hartford, Wis., announces a new $\frac{3}{4}$ to 1-ton worm drive truck to sell at a very attractive price. It is claimed that the specifications have more than shown their value in the exhaustive and varied road tests to which the truck has been subjected.

The worm driven rear axle is of David Brown construction. The worm wheel and differential are mounted as a single unit in a cast steel carrier placed in the center housing of the axle. The weight of the truck is carried on heavy steel tubes. In the lower part of the axle housing is a spacious oil reservoir and an automatic oil level and filter plug assures constant lubrication of all bearings. The axle can be disassembled and again assembled without removing it from under the truck.

The engine is a powerful Kissel-built, 32 horsepower, four-cylinder motor with bore of $3\frac{7}{8}$ and stroke of $5\frac{1}{2}$. It is cast en bloc. The motor bearings are of the highest quality of white bearing metal, steel-backed and babbitt-lined. The valves are of special gauge steel, tightly enclosed in compartments that are proof against oil and dust and the covers are quickly removable.

The cam shaft is an integral forging of high grade, scientifically hardened and mounted on extra large bearings. The crank case is built in halves, the lower section removable without disturbing any other part. The crank shaft is an extra large and heavy drop forging mounted on high quality steel-backed and babbitt-lined bearings. All motor parts are thoroughly protected from mud and water.

Lubrication is by the perfected splash system, a constant oil level being sup-

plied from a reservoir in the lower part of the oil basin. A positively-driven pump forces oil through tubes to a trough passing under each of the connecting rods. Oil is strained each time it enters the pump.

Carburetion is by a highly efficient special carburetor of Kissel design and Stromberg manufacture, mounted high to allow accessibility. The carburetor is fed by the Stewart-Warner vacuum system, which guarantees a uniform and always dependable flow of fuel, and eliminates deficiencies of pressure and gravity feeds and increases gasoline economy.

The clutch is a cone type, leather faced and with adjustable spring inserts that allow easy and gradual engagement. It is readily reached for adjustment through the floor of the truck, without disturbing any other unit. Drop-forged and heat-treated I-beam section connecting rods; split nut and worm type steering gear; Mayo or Fedders radiator; center control levers and hand throttle; foot accelerator and high-tension magneto ignition are other important points. The entire power plant is independently suspended at three points and is easily removed.

Both foot and emergency brakes are of the internal expanding type operating on rear wheel, the former by means of a pedal, the latter by hand lever. They are equalized. The transmission is connected with the rear axle through a grease-packed Spicer universal joint. It has a three-speed gear set and is attached by bell housing to motor. The differential is a large bevel gear type.

The speeds are automatically governed, twenty miles being allowed on third or direct drive, five on first and ten on second. The truck has a turning radius of twenty-five feet. The wheel base is 125 inches, tires optional—either $35 \times 4\frac{1}{2}$ pneumatic or 34×3 front and 34×4 rear, solid. The wheels are second growth hickory of special commercial vehicle S. A. E. artillery type.

The springs are semi-elliptic both front and rear and built of special alloy steel, the front springs being $2\frac{1}{4}$ inches wide by 38 inches long, the rear $2\frac{1}{2}$ inches by 50 inches.

Any type of body is built as desired. If the buyer prefers to have the body built by a local body builder, blue prints are furnished by the factory on request.

The material used and the mechanical details of the other six models of Kissel Kar trucks are similar to the $\frac{3}{4}$ to 1 ton truck, except that the 1,000 pound delivery is shaft driven and the $2\frac{1}{2}$ to 3, $3\frac{1}{2}$ to 4, and 6 ton sizes are chain driven, that construction being considered best for heavy duty. The 1 to $1\frac{1}{2}$ and $1\frac{1}{2}$ to 2 ton trucks have the David Brown worm drive construction, the same as the $\frac{3}{4}$ to 1 ton.

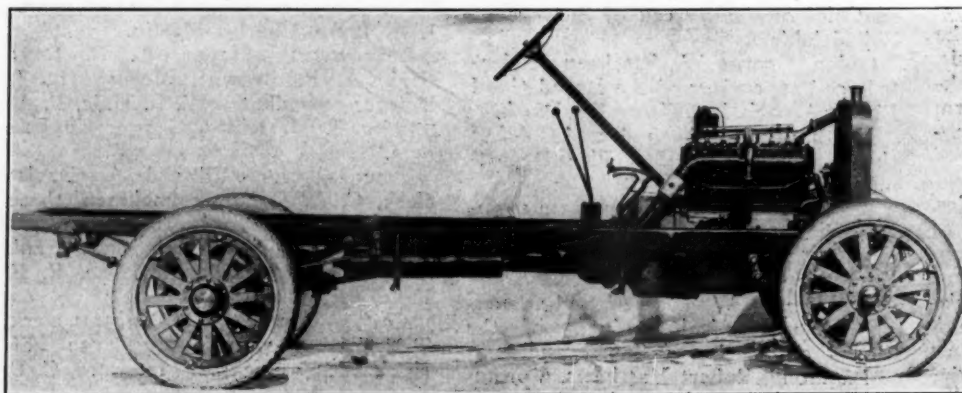
STUDEBAKER FLUSHER.

A Versatile Machine with Pump Pressure.

While the Studebaker flusher is primarily intended for the use its name indicates, the machine has a number of features which make it very valuable in a large variety of municipal uses. In the accompanying illustration, for instance, a flusher in the service of Boone, Ia., is used for spraying trees. Besides cleaning gutters, the machine is an efficient sprinkler for any type of highway and may also be used as an oil distributor. It may be used for sprinkling lawns in parks or boulevards or in front of public buildings, for spraying street trees and in case of emergency even for fighting fires until the regular apparatus is available.

The principal feature of the machine is that no air is used, the pressure being maintained by a gasoline engine which operates a single-stage centrifugal pump. The tank is quickly and completely filled and the full 750 gallons of the capacity are available. The pressure is at all times uniform and under the foot control of the driver from his seat, so that the steam may be readily adapted to conditions and desired results. The work is done efficiently and without waste.

The tank is round and of sheet steel welded by the acetylene process. It is mounted on a channel steel frame with heavy metal saddles, no wood being used. There is in the rear end an additional 25-gallon compartment to hold water in connection with the engine cooling system. The truck is platform style, fitted with Timken roller bearing axles.



NEW KISSELKAR $\frac{3}{4}$ TO 1 TON TRUCK.

The engine is a Studebaker, auto type, four-cylinder, four-cycle motor, with Bosch high-tension magneto, Schebler carburetor, constant level splash combined with forced feed oiling system through sight feed, the oil being recirculated from the oil well in bottom of crank case through strainer. The motor gives adequate power with plenty of reserve, developing 14 h.p. at 800 revolutions. The single-stage pump is specially designed for the purpose, weighing less than the two-stage pump generally used. It has a 20-inch closed impeller, which delivers the necessary water at about 40 pounds per square inch. The entire power plant is practically self-contained and free from vibration.

All water connections are flexible, preventing leakage at joints. The nozzles are of Studebaker pattern, adjustable and designed to deliver a fan-shaped sheet of water at an angle producing a chiseling, shoveling and scrubbing effect. Vertical or Niagara heads may be used to sprinkle a 30 or 40-foot street at one run. While 40 pounds is normal pressure, greater pressures up to 60 pounds can be obtained by throttle control. All control is from the foot-board.

By using a spraying mixture in the tank and hose with suitable nozzle, lawns, trees and shrubbery may be sprayed. The flusher may be used for distributing road emulsions or cold or pre-heated oils of not greater than 30 per cent asphaltic base.

The flusher described is made by Studebaker, South Bend, Ind.

INDUSTRIAL NEWS

Cast Iron Pipe.—Chicago—The city of St. Paul is in the market for 1,500 to 2,500 tons. At Madison, Wis., bids are being asked on 600 tons. Prices have been advanced 50 cents per ton. Quotations: 4-inch, \$30.50; 6-inch and up, \$28.50; class A, \$1 extra. Birmingham—There have been no events of importance and the new business expected has not materialized. It is agreed, however, that the general trend is good and there is a prospect of increasing output. Quotations: 4-inch, \$24; 6-inch and up, \$22. San Francisco—Business is dull, as is natural this season, the only recent inquiry being for a fire protection system at the Benicia Arsenal. A number of municipal water projects, however, are expected to come up for figures in the near future. Prices are quite firm. Quotations: 4-inch, \$35; 6-inch and up, \$33; class A, \$1 extra. New York—While no new municipal lettings have been announced, inquiries from private gas and water companies continue active, and numerous contracts are being closed. Prices are strong. Quotations: 6-inch, class B and heavier, \$29; class A, \$30.

Lead.—Lead has advanced and is active. Quotations: New York, 5.50 cents; St. Louis, 5.40.

The Deckman-Duty Brick Company and the Wooster Shale Brick Company announce that the plants and properties of the two companies have been merged under the name of the Medal Paving Brick Company. The officers of the new company will be Spencer M. Duty, president; Chas. J. Deckman, vice-president; Herbert C. Moatz, treasurer—the present officers of the Deckman-Duty Brick Company—and W. R. Barnhart, Jr., secretary, and F. E. Schultz—former officers of the other merging concern. The new company will operate its plants at Cleveland, Carrollton, Malvern and Wooster, Ohio, at which the most approved and scientific methods of manufacture will be used in the production of its widely-known "Medal Block." The output of the company will be in excess of fifty million yearly. The new company is capitalized at \$1,000,000, not all of which will be issued at the present time, a certain amount being held as treasury stock, for use in future development as required. The general offices of the company will remain at 1305-1308 Swetland Building, Cleveland, O.

The Virginia Portland Cement Company announces the retirement of R. W. Kelley, president; Michael Gavin, vice-president, and F. W. White, treasurer, from their respective offices, and the election of Harry C. Trexler, president; E. M. Young, vice-president, and Alonzo F. Walter, treasurer. The main offices of the Virginia Portland Cement Company will be in the Young Building, Allentown, Pa. Effective January 1, 1916, The William C. Hartranft Co. discontinues the sale and distribution of Old Dominion Portland Cement, and the Virginia Portland Cement Company itself will hereafter sell and distribute its product direct to its customers under the supervision of B. L. Swett, sales manager.

Iron Ore and Pig Iron Production.—According to the annual report of Secretary Lane, of the Department of the Interior, in 1880 the production of iron ore was 7,000,000 long tons, as compared with 60,000,000 tons in 1913. The production of pig iron increased in the same period from less than 4,000,000 tons to more than 30,000,000 tons, the value of which in 1913 exceeded \$458,000,000. The United States produces annually about 40 per cent of the world's supply of iron, and is abundantly supplied with iron ore. Iron ore forms the basis of the largest manufacturing industry in the United States. The profits to both labor and capital are made from the manufacture and sale of iron and steel products rather than from iron-ore mining. Recent estimates credit the United States with about 7,500 million tons of iron ore of present-day commercial grade. Immense as this available supply may seem, it is not sufficient to

prolong production for many decades at the rate of increase in consumption of ore that has obtained thus far.

NEWS OF THE SOCIETIES

(Continued from page 59.)

head for the past two years, will begin the publication of a bi-monthly journal to be known as the "Journal of the Engineers' Club of St. Louis."

The Engineers' Club of St. Louis constitutes 70 per cent of the membership in the association at present and during the past two years furnished about two-thirds of the papers published in the association journal. Its new journal, therefore, will be similar in scope and character to the journal of the association. Its board of editors will include civil, mechanical and electrical engineers, so that all branches of engineering will be fully covered.

Conference of Southern Mayors.

The program for the Conference of Southern Mayors, which will be held at Jacksonville, Fla., Jan. 18, 19 and 20, is as follows:

Tuesday, Jan. 18, 9.30 a. m.—Addresses of welcome, J. E. T. Bowden, Charles H. Mann; responses of welcome, John McDiarmid, mayor of De Land, and O. B. Eaton, Winston-Salem, N. C.

Temporary organization.

Election of chairman, vice-chairman, secretary and assistant secretary.

Appointment of legislative, publicity and permanent organization committees.

Addresses, Charles H. Patterson, of New Orleans, La., The Disadvantages of No Agreement. General Discussion. Joseph C. Logan, of Atlanta, Ga., The Advantage of the Transportation Agreement. General discussion.

12.30—Adjournment.

2 p. m.—Address, Bridges Smith, mayor, Macon, Ga., Sob Stories Told to Mayors. Ten minutes' discussion.



SPRAYING WITH STUDEBAKER FLUSHER, BOONE, IA.

Address, William M. McGrath, of Birmingham, Ala., The Situation in Alabama. General discussion.

5—Adjournment.

8.30—Banquet.

Wednesday, 9.30 a. m.—Report of legislative committee.

Discussion of proposed ordinance to eliminate the floating pauper.

Adoption of approved ordinance.

Address, W. J. Pierpont, mayor of Savannah, Ga.

Discussion of methods to secure enactment of ordinance as adopted.

12.30—Adjournment.

2.30—Boat trip on St. Johns river.

8—Report of committee on permanent organization.

Permanent organization.

Thursday, 9.30—Address, S. A. Dickson, mayor, Shreveport, La. Discussion.

12.30—Adjournment.

2.30—General discussion of plans for future work.

Automobile ride around the city.

League of American Municipalities.

The League of American Municipalities will hold its 1916 convention at Newark, N. J. The dates decided on are September 6, 7, 8 and 9.

The coming of the league will mark its first visit to the East in several years, the conventions in Buffalo and Montreal being the nearest to Newark or New York which the organization has ever held.

The league is a most important adjunct to municipal governmental improvement, its range covering the entire field of city administration from charter reforms to disposal of garbage. The league had its beginning in the Middle West, and is gradually being augmented by the addition of cities in all parts of the country.

Cornell Society of Civil Engineers.

The Cornell Society of Civil Engineers will hold its annual banquet at the Hotel McAlpin Friday, January 21, 1916.

The banquet will be a testimonial to Prof. Charles Lee Crandall, who was retired last June under the Carnegie Foundation.

Colorado Good Roads Association.

The official call for the sixth annual convention of the Colorado Good Roads Association has been issued. The dates for the convention as finally decided by the executive committee are January 19 and 20, and the meeting is to be held in Denver.

The meeting place has, by vote of the executive committee, been changed to Denver because of the fact that the people of Boulder do not find themselves in a position at this time to entertain the convention. At the last annual meeting it was voted to hold the 1916 convention in Boulder, but the change has been made necessary for the reason above stated. The meeting will immediately follow that of the State Association of County Commissioners to be held in Denver on January 17 and 18.

PERSONALS

(Continued from page 59.)

Morley; 2d ward, Jesse F. Neal; 3d ward, J. R. Butcher.

Albion—Mayor, O. D. Craford; councilmen for two years, Elwood Harold and Charles Hunt; councilman, one year, W. N. Chapman.

Ritzville—Mayor, A. L. Wiffin; councilmen, John Truax, Charles Hollenshead, W. H. Thiel, O. M. Irby, J. L. Cross, Albert Ott; clerk, M. W. Anthony.

Puyallup—Mayor, Lucien Dean; city clerk, J. L. LePlante; councilman-at-large, George D. Spurr; councilman, 1st ward, J. M. Jones; 2d ward, George T. Chamberlain; 3d ward, Joseph Bartel.

Sumner—Mayor, Harry Henke; councilmen, J. J. Hocking and F. E. Stewart.

Ruston—Councilmen, Albert F. Cook, Joseph H. Dutlinger and Charles E. Girod.

Charlestown—Mayor, M. M. Bowman; clerk, William Callow; councilman-at-large, Paul Buhl; councilmen, P. F. Lent, J. B. Wood, Fred Peak and Percy Counter.

Montesano—Mayor, S. S. Morse; clerk, George W. Gauntlett; councilman-at-large, Edward K. Bishop; councilmen, R. G. Trask, R. M. Price and Ora L. Watson.

Olympia—George A. Mottman, re-elected mayor; W. A. Hodge, re-elected city clerk; councilman-at-large, G. N. Talbott; 1st ward, C. W. Maynard; 2d, L. C. Iamberg; 3d, E. McClintic; 4th, George Draham.

Tenino—Councilmen, T. B. Fanshier, W. A. Millington and F. W. Fenton.

Renton—Mayor, E. J. Hughes; city clerk, Grant Bates; councilmen, 1st ward, John Saull; 2d ward, Thomas Raymond; 3d ward, H. Evans; councilman-at-large, Dr. C. W. Willson.

Centralia—Mayor, John Galvin; commissioners, W. W. Dickerson and T. C. Rogers.

Following have been elected in Oregon:

Tualatin—Mayor, Thad Sweet, re-elected; recorder, James H. Schamoni; aldermen, A. D. Smith, E. L. Cole and Albert A. Duley.

Beaverton—H. G. Vincent, mayor; councilmen, Dan Gray and F. W. Cady; recorder, C. E. Hedge.

Freewater—Mayor, G. H. Bishop; recorder, J. C. Pritchett; councilmen for two years, Dr. J. E. Vanderpool, J. A. Schmidt and C. H. Brinker; councilman for one year, J. W. Kelly.

Sumpter—W. C. Common, mayor; A. J. Denny, Guy Harris, John W. La Bau, Dr. A. H. Brown, John H. Clark, C. A. Tibbs, W. S. Hughes and G. H. Wilson, councilmen.

Cottage Grove—J. H. Chamber, re-elected mayor; J. E. Young, recorder; aldermen, first ward, Geo. O. Knowles; second ward, D. Sterling; third ward, Dr. A. W. Kime and A. A. Richmond.

Creswell—C. H. Sedgwick, re-elected mayor; councilmen, George Gilfry, William Johnson and B. M. Martin.

H. E. Richardson was elected recorder, Coburg.—Mayor, Harry Macy; councilmen, Mrs. Alcester VanDuyn, Clive Taylor, Wesley Beeson; marshal, Albert Leonard.

Union.—Mayor, T. D. Smith; councilmen, three-year term, O. M. Crossland and W. W. Stevens; recorder, L. Z. Terrall; street commissioner, J. W. Ferguson.

Oregon City.—E. C. Hackett, mayor; Fred Metzner, A. B. Buckles and E. L. Moore, members of the council. Marshfield.—R. A. Copple, mayor.

Cottage Grove.—Mayor, J. H. Chambers, re-elected; Joe Young, recorder; George Knowles, David Sterling and A. A. Richmond, councilmen.

Wallowa.—R. M. McCrae, mayor; E. A. Searle, treasurer; J. C. Baird, recorder; Roy Conklin, J. H. Mimnaugh and J. J. Hawley, councilmen.

Fairview.—W. A. Stennick, John Jonas and David S. Dunbar, councilmen.

Albany.—L. M. Curl, re-elected, mayor; Harry Cusick, re-elected, city treasurer; City Recorder Guy Lewelling, re-elected.

United States Civil-Service Examination.

Surveyor (Male).

Engineer Department at Large.

February 2-3, 1916.

The United States Civil Service Commission announces an open competitive examination for surveyor, for men only, on February 2 and 3, 1916. From the register of eligibles resulting from this examination certification will be made to fill vacancies as they may occur in this position in the Engineer Department at Large, War Department, and in positions requiring similar qualifications. The usual entrance salary of this position is \$90 to \$150 a month, with subsistence when absent on duty from permanent station. Competitors will be examined in the following subjects, which will have the relative weights indicated:

Subjects.	Weights.
1. Mathematics (including problems and computations involving algebra, geometry, plane trigonometry, and use of logarithm tables or slide rule)	20
2. Theory and practice of plane surveying.	30
3. Plotting of field notes and drawing... ..	20
4. Training and experience.....	30
Total	100

Applications will be received from those who have graduated or are about to graduate in civil engineering from a recognized technical school, or from those who, in addition to a good general education, have had not less than three years of good general experience in surveying and leveling; those who have had more or less extensive or higher-grade experience will be rated accordingly.

Persons who meet the requirements and desire this examination should at once apply for Form 1312, stating the title of the examination for which the form is desired, to the United States Civil Service Commission, Washington, D. C.

ADVANCE CONTRACT NEWS

ADVANCED INFORMATION BIDS ASKED FOR

To be of value this matter must be printed in the number immediately following its receipt, which makes it impossible for us to verify it all. Our sources of information are believed to be reliable, but we cannot guarantee the correctness of all items. Parties in charge of proposed work are requested to send us information concerning it as early as possible; also correction of any errors discovered.

CONTRACTS AWARDED ITEMIZED PRICES

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS				
W. Va.	Brandywine	Jan. 15	Constructing road	L. D. Trumbo
Wash.	Walla Walla	Jan. 15	Paving streets, cost \$10,000	W. R. Rehorn, City Engr.
Ida.	Wallace	Jan. 15	Paving and improving streets	Robt. Merriam, City Engr.
Mich.	Detroit	10 a.m., Jan. 15	Furnishing 160,000 sq. yds. of creosoted wood blocks	G. H. Fenkell, Comr. P. W.
Washington	Seattle	Jan. 16	Constructing permanent highway No. 12	County Commissioners
Ind.	Ft. Wayne	Jan. 17	Const. 27,200 sq. yds. asph. mac. & 8,175 ft. conc. curb & gutter & making 17,700 cu. yds. of excavation	Board of Park Comrs.
Ill.	Evanston	8 p.m., Jan. 17	Laying 71,300 yards brick pavement	H. P. Pearsons, Pres. Bd. L. Imps.
O.	Cleveland	noon, Jan. 17	Grading, draining, curbing and paving with brick, concrete, asphalt or bituminous macadam and constructing sidewalk	C. E. Burger Village Clerk, Marshall Bldg.
Ia.	Ames	Jan. 17	Constructing 122,000 sq. yds. of paving, 73,276 ft. of curb and gutter, and excavating 13,000 cu. yds.	J. Q. Wickham, City Engr.
Minn.	St. Paul	10.30 a.m., Jan. 17	3,600 cu. yds. asphalt sand, 360 tons of limestone dust, 60,000 cement paving blocks, and 10,500 cement sidewalk tiles	August Hohenstein, Pur. Agt.
N. Y.	Albany	3 p.m., Jan. 17	Making asphalt repairs; furnishing road oil, broken stone and screenings	Isadore Wachsman, Secy. Bd. of Cont. & Sup.
Mo.	Higginsville	Jan. 17	12,000 sq. yds. vertical fiber brick paving and 6,000 ft. combination curb and gutter	Ralph Houscher, City Clk.
Ill.	Cicero	8 p.m., Jan. 17	Paving with brick and laying cement sidewalk	Geo. Comerford, Pres. Bd. of Local Impr.
Ala.	Camden	Jan. 17	Constructing 16 miles of gravel roads	J. M. Stamford, Ch. Co. Comrs.
Tenn.	Jamestown	Jan. 18	Grading and macadamizing 34 miles of road	W. I. Smith, Engr.
N. Y.	Brooklyn	11 a.m., Jan. 19	Furnishing 15,000 cu. yds. asphalt sand, 6,500 cu. yds. binder stone, 2,200 tons limestone dust, 12,000 gals. kerosene oil, and 12,000 gals. residuum oil	L. H. Pounds, Boro Pres.
Mass.	Boston	noon, Jan. 19	Repairing sidewalks and asphalt and bitulithic pavements	E. F. Murphy, Comr. P. W.
Ill.	Danville	Jan. 20	Furnishing cement for constructing county roads	P. C. McArdle, Supv. Engr.
Ill.	Elgin	11 a.m., Jan. 20	Laying 27,468 yds. asphaltic concrete and 14,000 lin. ft. combined curb and gutter	M. H. Brightman, City Engr.
N. J.	Newark	3.15 p.m., Jan. 20	Laying 60,000 sq. ft. bluestone and artificial stone sidewalks and furnishing flags and curbs	M. R. Sherrerd, Chief Engr.
Tex.	San Antonio	Jan. 20	185,000 yds. first-class pavement with concrete curbing	Fred Fries, City Clerk.
Ia.	Missouri Valley	Feb. 1	Laying 25,000 yds. first-class pavement, 16,000 ft. curbing and some storm sewers	T. S. DeLay, Consulting Engr., Creston
Md.	Sharpsburg	11 a.m., Jan. 20	Constructing walk on Antietam battlefield	James Canby, Depot Quartermaster, Washington, D. C.
Ind.	Evansville	10 a.m., Jan. 20	Furn. broken stone and gravel for repairing roads	C. P. Beard, Co. Aud.
Ind.	La Porte	11 a.m., Jan. 22	Laying first-class pavement on several streets	W. F. Krueger, City Clerk
Tex.	San Antonio	Jan. 24	Furnishing road oil suitable for any kind of oil	R. M. Mackey, Pur. Agt.
Minn.	Duluth	2 p.m., Jan. 24	Constructing state rural highway	O. Holden, Co. Aud.
Wash.	Olympia	Jan. 24	Constructing 24-mi. highway, cost \$59,000	W. R. Roy, St. Hwy. Comr.
Minn.	St. Paul	10 a.m., Jan. 24	Improving several county roads	G. J. Ries, Co. Aud.
Ia.	Fort Madison	Jan. 25	Constructing 1 1/2 miles concrete and 1/2 mile of brick pavement	R. J. Lewis, City Engineer.
Minn.	Crookston	Jan. 25	Constructing drainage ditch and building 9 miles of road	H. J. Welte, Co. Aud.
Ia.	Missouri Valley	Feb. 1	Laying 40,000 sq. yds. of brick, concrete, vertical fibre brick, tarvia or bitulithic	S. R. Williams, City Clerk.
Ia.	Storm Lake	Feb. 1	Constructing about 60,000 yds. pavement	J. E. Buland, City Clerk.
Ill.	Galva	Feb. 1	14,000 yds. brick pavement and 5,600 ft. curb and gutter	City Clerk.
Ind.	Portland	Feb. 1	Constructing several roads	J. M. Boniface, Co. Aud.
Ind.	South Bend	11 a.m., Feb. 7	Grading, draining and paving with concrete	Clarence Sedgwick, Co. Aud.
Ind.	Angola	2 p.m., Feb. 8	Improving 12 miles of road	F. C. Dewey, Co. Aud.
Ind.	Columbia City	1 p.m., Feb. 9	Constructing three gravel roads	T. A. McLaughlin, Co. Aud.
Ind.	Columbia City	2.30 p.m., Feb. 9	Constructing county road	T. A. McLaughlin, Co. Aud.
New Zealand	Dunedin	Feb. 9	48,000 sq. yds. wood block, rock asphalt or asphalt paving	Town Clerk.
Wash.	Spokane	Feb. 15	200,000 cu. yds. of excavation and 200,000 sq. yds. of various pavements	J. W. Strack, Co. Engr.
Ia.	Spencer	Feb. 15	Laying 50,000 sq. yds. hard surface pave., cost \$50,000	E. O'Keefe, City Engr.
Kan.	Atchison	Mar. 1	Paving several streets	V. L. King, City Clerk.
Ala.	Huntsville	Mar. 6	Constructing 3 1/4 miles macadam road	M. S. Bingham, Rd. Supv.
Ill.	Danville	Mar. 14	Constructing 17 1/4 miles of county road	P. C. McArdle, Supv. Engr.
SEWERAGE				
Mo.	Memphis	2 p.m., Jan. 15	Constructing 17.3 miles drainage ditch; total yardage, 557,000	C. J. Wiegner, Eng.
Fla.	St. Petersburg	Jan. 15	Drainage work to cost \$100,000	F. R. Fracksen, Largo.
Ind.	Parr	2 p.m., Jan. 15	Constructing drainage ditch	J. E. Alter, Supt. of Const.
Minn.	Blue Earth	1 p.m., Jan. 16	Constructing tile drainage ditch; cost, \$41,000	C. L. Kennedy, Co. Aud.
Cal.	Oakdale	Jan. 17	Extending and constructing irrigation laterals; cost, \$20,000	Sec'y Irrigation District.
O.	Cleveland	noon, Jan. 17	Constructing storm and sanitary sewers	C. E. Burger, Village Clerk, Marshall Bldg.
Col.	Montrose	4 p.m., Jan. 18	Constructing 9 1/4 miles drainage laterals	U. S. Reclamation Service.
Minn.	St. Cloud	2 p.m., Jan. 18	Constructing tile drain, cost \$3,400	Nicholas Thomey, Co. Aud.
O.	Toledo	Noon, Jan. 18	Const. 2,500 ft. 8 to 12-in. vitrified pipe sewer	Gabe Cooper, Co. Aud.

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
Mich., Saginaw	Jan. 18.	Furnishing 4 to 18-in. vitrified sewer pipe and 3 to 6-in. vitrified drain tile.....	R. F. Johnson, Comr. Lt., Water & Sewers.
Mo., Kansas City	Jan. 18.	Extending sewers 10 blocks.....	E. J. McDonald, Secy. Bd. P.W.
La., Lisbon	Jan. 18.	Constructing sewer system and disposal plant.....	H. C. Kurtz, City Clerk.
N. Y., Brooklyn	11 a.m., Jan. 19.	Constructing sewer basins.....	L. H. Pounds, Boro Pres.
Mass., Boston	Jan. 19.	Cleaning 8,050 catch basins.....	E. F. Murphy, Comr. P. W.
Ill., Chicago	noon, Jan. 19.	Constructing intersecting sewer in Jackson Park.....	South Park Comrs.
Ind., Portland	Jan. 22.	Constructing drainage ditch.....	W. H. Badders, Supt. of Const.
O., Cuyahoga Falls	Jan. 24.	Constructing sanitary sewers in several streets.....	W. F. Williston, Vil. Clk.
Ill., Elgin	3 p.m., Jan. 24.	Treatment plant & sewerage system for state hospital.....	F. D. Whipp, Supv. Springfield
Minn., Crookston	10 a.m., Jan. 25.	Repairing and extending county ditch, cost \$7,467.....	H. J. Welte, County Auditor.
Utah, Salt Lake City	10 a.m., Jan. 25.	Const. outlet sewer & ditch to connect with flume.....	K. A. Scheld, City Rec.
Tex., Barstow	Jan. 25.	Constructing dams, reservoirs and other irrigation improvements	G. W. Dyer, Pres. Ward County Irrigation District.
Minn., Fergus Falls	Jan. 25.	Drainage ditch construction requiring 3,400 ft. 12-in. tile and 4,000 cu. yds. of excavation	Wm. Lincoln, Co. Auditor.
Okla., Cushing	7.30 p.m., Jan. 27.	Furnishing materials for constructing sewer.....	Benham Engr. Co., Okla. City.
Minn., So. St. Paul	8 p.m., Jan. 31.	Constructing about 4,000 ft. 12-in. sewer.....	J. R. Stevenson, City Rec.
Neb., Wausau	1 p.m., Feb. 7.	Const. 19,000 ft. sanitary sewer with appurtenances; constructing disposal plant.....	F. E. Anderson, City Clk.
Ia., Wall Lake	Apr. 1.	Straightening and deepening river and draining swamp.....	Seth Dean, Eng., Glenwood.
Mich., Macon	Apr. 1.	Constructing branch of Macon drain	D. S. Sullivan, Co. Drain Comr.

WATER SUPPLY

Ill., Decatur	Jan. 15.	Laying 10,000 ft. 6-in. water main.	P. T. Hicks, City Engr.
Cal., Los Angeles	Jan. 17.	Furnishing and laying 44,600 ft. 4 and 6-in. cast iron pipe and making alterations to pumping plant.	County Bd. of Supervisors.
N. Y., Albany	3 p.m., Jan. 17.	Furnishing aluminum sulphate and hypochlorite of lime.	Isadore Wachsmann, Secy. Bd. Cont. & Sup.
D. C., Washington	Jan. 17.	Steel and iron pipes, valves, etc.	Pur. Off., Panama Canal
Minn., St. Paul	Jan. 17.	30,000,000-gal. and 7,000,000-gal. covered reservoirs, 15,000,000 motor driven pumping engine and revolving screens.	Aug. Hohenstein, Pur. Agt.
O., Cleveland	noon, Jan. 17.	Laying 6-in. water main.	C. E. Burger, Vil. Clk., Marshall Bldg.
La., Opelousas	Jan. 18.	Constructing water works and electric light plant.	A. C. Jones, Supt. of W. W.
Minn., Tracy	8 p.m., Jan. 18.	Constructing 100,000-gal. tank and steel tower.	Chas. M. Campbell, City Rec.
Mich., Saginaw	Jan. 18.	Furnishing c.l. pipe and specials.	R. F. Johnson, Comr. Lt., W. & Sew.
Ill., Berwyn	8 p.m., Jan. 18.	100 ft. 16-in. c.l. pipe, 3 valves and 10-in. meter.	B. Strutzenberg, City Engr.
Miss., Clarksdale	Jan. 18.	Constructing power plant, building and erecting other equipment.	W. M. Purnell, City Clerk.
La., Opelousas	Jan. 18.	Two hundred water meters.	A. C. Jones, Supt. W. Wks.
Md., Baltimore	Jan. 19.	Furnishing cast iron pipe and fittings, hypochlorite of lime sulphate of iron, galvanized iron pipe, pig lead, &c.	W. E. Lee, Water Engr.
Ill., Chicago	noon, Jan. 19.	Constructing water main in Jackson Park.	South Park Comrs.
Minn., St. Paul	10.30 a.m., Jan. 20.	Furnishing 435 water meters, 40 tons of pig lead, 2,475 tons of cast iron pipe, 55 tons special castings, 150 fire hydrants, 2,050 corporation cocks and brass gate valves, 2,500 curb cocks, 3 tons of wiping solder, 72 tons extra strong lead pipe and stop and paving boxes, water gates, valve boxes and paving covers.	August Hohenstein, Pur. Agt.
Tasmania, Hobart	4 p.m., Jan. 24.	Supplying and delivering 42,000 ft. of c.l., wrought iron or steel pipe.	W. A. Brain, Town Clk.
Wis., Kenosha	Jan. 29.	Const. wtr. wks. pump. sta. & purification plant.	Board of Water Comrs.
Wis., Oshkosh	2 p.m., Jan. 31.	Constructing filtration plant.	Board of Public Works.
S. C., Orangeburg	Feb. 1.	One or two engine generator exciter units, condenser, motor-driven triplex pump, complete switchboard, 300-ton c.-l. pipe, etc.	J. E. Salley, Supt. W. & Lt.
New Zealand, Dunedin	Feb. 9.	Furn. & erect. mech. filter & aerat. plant for pub. baths.	Town Clerk
O., Farmersville	Feb. 15.	Waterworks supplies.	A. F. Gilbert, Vil. Clk.
Ala., Cullman	Apr. 1.	Laying 2 miles of 6-in. water mains; cost \$12,000.	A. G. Coe, City Clerk.

MISCELLANEOUS

Md., Baltimore	Jan. 15.	Portland cement for city for 1916.	R. M. Cooksey, Hwy. Engr.
Neb., Sydney	Jan. 16.	Constructing city hall; estimated cost, \$20,000.	B. M. Reynolds, Arch., North Platte.
D. C., Washington	Jan. 17.	Constructing postoffice at Hackensack, N. J.	Supervising Architect, Treasury Department.
Ga., Atlanta	2 p.m., Jan. 17.	Furnishing 8,000 bbls. Portland cement.	Supt. of Prisons, Washington, D. C.
R. I., Providence	2.15 p.m., Jan. 17.	Furnishing 7,000 bbls. Portland cement and 1,800 bbls. natural cement.	Comr. Public Works.
O., Cincinnati	noon, Jan. 17.	Furnishing 4,300 enamelled metal street name signs and 4,250 enamelled metal street number signs.	Ernst Von Bargaen, City Pur. Agt.
Mass., Boston	noon, Jan. 17.	Collecting and removing offal.	E. F. Murphy, Comr. P. W.
Mass., Boston	noon, Jan. 18.	Collecting and removing ashes and refuse.	E. F. Murphy, Comr. P. W.
Mich., Saginaw	Jan. 18.	Furnishing portland cement.	Geo. Holcomb, Comr. P. W.
D. C., Washington	3 p.m., Jan. 18.	Constructing post office at Anoka, Minn.	J. A. Wetmore, Supv. Arch.
N. Y., New York	Jan. 18.	Disposing of garbage for 5 years.	J. T. Fetherston, Comr. St. Cl.
Ky., Louisville	Jan. 18.	Cement retaining tank.	Comrs. of Fisheries, Dept. of Com. Washington, D. C.
D. C., Washington	Jan. 19.	Constructing postoffice at Hornell, N. Y.	Supervising Architect, Treasury Department.
N. Y., Brooklyn	11 a.m., Jan. 19.	Constructing fill at sewage pumping station.	L. H. Pounds, Boro Pres.
N. J., Atlantic City	Jan. 20.	Two-ton automobile truck.	W. H. Bartlett, Dir. Pub. Safe.
N. J., Newark	3.15 p.m., Jan. 20.	Constructing engine house at Newark port terminal.	M. R. Sherrerd, Ch. Engr.
Fla., Jacksonville	10 a.m., Jan. 21.	Sale of 3 dump wagons and 6 dump carts.	L. L. Meigs, Ch. Co. Comrs.
D. C., Washington	Jan. 21.	Constructing postoffice at Waterloo, N. Y.	Supervising Architect, Treasury Department.
D. C., Washington	Jan. 24.	Constructing postoffice at Ashland, Ky.	Supervising Architect, Treasury Department.
D. C., Washington	Jan. 26.	Constructing post office at Shelby, N. C.	Supv. Arch., Treasury Dept.
D. C., Washington	1.30 a.m., Jan. 27.	Constructing post-office at Ellenburg, Wash.	J. A. Wetmore, Act. Supv. Arch.

STREETS AND ROADS

Bay Minette, Ala.—L. C. Irvine, of Mobile, is to be one of chief speakers in whirlwind campaign which is to be waged in Baldwin County during next

two weeks in interest of two-bond issue election, which is to be held on the 18th of this month. One bond issue is to be for \$200,000 for road improvement and other for \$55,000 for purpose of clasping hands with Mobile County through Tensaw Delta.

Little Rock, Ark.—Road Improvement Dist. No. 7, of Pulaski County, Dec. 31 sold to Ledwidge & Cammack, of Little Rock, \$35,000 of improvement bonds, at 103.

Miami, Ariz.—Board of Supervisors of Gila County Dec. 31 awarded the Gila

County road bond issue of \$353,000 to Bolger, Mosser & Willaman, that firm having offered substantial premium of \$20,100.

Little Rock, Ark.—Road Improvement Dist. No. 7 of Pulaski County Dec. 31 sold to Ledwidge & Cammack of Little Rock \$35,000 of improvement bonds at 103. This is one of the best prices yet brought by bonds under the Alexander act. It is for construction of 7½ miles of road between England and Toltec.

Anaheim, Cal.—Plans and specifications were adopted by city trustees at their meeting Dec. 30 which provide for paving of Broadway its entire length. Work is divided into two sections, one of which extends from East St. to east line of Los Angeles St., while other covers thoroughfare from that termination and extends its entire length to western limits of the city. Trustees adopted this plan owing to the magnitude of the job.

Daly City, Cal.—City is to spend \$35,000 on street work, according to terms of contract let yesterday by City Trustees. The work will cover a large district.

Ontario, Cal.—During year 1916 city plans to spend close to \$200,000 for street paving.

Sacramento, Cal.—Bids for construction of 24.2 miles of State Highway in Superior, Cal., and bascule bridge over Petaluma Creek, near Green Point, between Marin and Sonoma Counties, have been opened by State Highway Commission and have been forwarded to Advisory Board. Proposed work will represent an outlay of \$334,292.50. Bid for the Auburn-Roseville lateral was \$67,039.40, and for Tehama unit, between Corning and Proberta the bid was \$61,282.

San Diego, Cal.—Bids for riprapping temporary bulkhead between Broadway and Market St. are in excess of Council appropriation of \$10,000, according to report of City Engineer Cromwell to operating department. The lowest bid for placing the stone boulders is that of Fred W. Steffen, \$10,040. Added to this is a bid of \$600 for furnishing broken stone. Manager Lockwood said he was certain that material could be furnished and placed at figure less than bids submitted.

Bridgeport, Conn.—Commission has recommended to Council improvement and extension of Boston Ave., making it a thoroughfare to connect East Side and North End of city. Board of Apportionment has been urged to appropriate \$55,000 for work.

Washington, D. C.—Condemnation proceedings for widening of two of main travelways between District of Columbia and Maryland have been begun by corporation counsel's office of District. Roads to be improved are Georgia Ave. from Rock Creek Church road to District line and Wisconsin Ave. from Massachusetts Ave. to District line. It is estimated that cost of widening streets from their present width will be about \$200,000 in case of Georgia Ave., which will be widened 30 ft. and about \$100,000 in case of Wisconsin Ave., which will be widened 60 ft.

Eustis, Fla.—See "Sewerage."

Miami, Fla.—War Department has given its consent for solid embankment to be thrown up entirely across bay, except 1,500 ft. on either side, which will be left open for tide to ebb and flow. This embankment will be 105 ft. wide on top and will be leveled and treated with asphalt, making one of most popular drives in Dade County. It is probable that during coming year an asphalt road will be completed from Ocean Beach to Palm Beach, following in plain view of ocean entire distance. It is also expected that work on Tamiami Trail from Miami to Tampa will be commenced within next two months. It is said that Lee County people will commence work in that county simultaneously with work in Dade County.

Atlanta, Ga.—Annual report of chairman of Commission urges improvement of several streets by paving and resurfacing.

Alton, Ill.—Following a conference between Mayor and Assistant City Engineer Thomas Long, Mayor stated Jan. 1 that plans were to be drawn up for road which will lead to Oakwood Cemetery. This is to be included in plans for paving of Main St. from Second to Salu addition. After running the paved street to Salu St. it is proposed to have it continue to cemetery. A number of turns will be necessary and there will

be some difficulty about keeping street in city limits but assistant city engineer believes that it can be done.

Springfield, Ill.—State of Illinois—through second special sessions of Forty-ninth General Assembly to begin at Springfield Jan. 11—will be asked to authorize state bond issue for road improvement. Gov. Dunne did not indicate size of bond issue he will recommend. It is presumed lowest figure is \$100,000,000 and that eventual figure may be double or triple. It will be urged in behalf of proposal, it is understood, that \$200,000,000 already has been issued in bonds by state of California and \$250,000,000 is approximate size of state bonds issued in New York.

Muncie, Ind.—Committee is surveying proposed improvement of six streets and report will be made shortly to Council.

Tipton, Ind.—County Commissioners, at special meeting Dec. 31, decided to hold an election on April 4 on question of building three concrete roads.

Topeka, Kan.—City Commission has authorized paving on 12 streets.

Burlington, Ky.—Election will be called in Boone County May 3 to vote on bond issue of \$200,000 for good roads.

Hopkinsville, Ky.—Town is discussing special election to vote on road bond issue.

Louisville, Ky.—Board of Public Works is holding daily meetings for purpose of mapping out program of street construction and reconstruction. After tentative program has been drawn up it will be submitted to Mayor Buschemeyer for approval. Board members have before them list of streets to be reconstructed that calls for estimated expenditure of \$300,000. As appropriation is but \$100,000 it is necessary for board members to pick out a third of streets most in need of repairs or streets that form parts of main arteries of travel. It is desire of Board of Public Works to get program in approved shape as early as possible so that preparations can be made for receiving bids. As much of work as possible will be let at one time in order to attract bidders and obtain best possible figures. It has been customary to begin new city construction work on St. Patrick's day. This will probably be opening date in 1916.

De Ridder, La.—Citizens are contemplating \$700,000 bond issue for good roads.

Flint, Mich.—Estimates for public improvements in Flint during 1916 at a total cost of more than \$500,000 were presented to common council by City Engineer E. C. Shoecraft Jan. 3 and approved by aldermen. Improvements consist of pavements and three classes of sewers—sanitary, storm water and interceptors. Total estimated cost of pavements of 32 streets is \$273,536.29, and estimated cost of sewers is \$232,070.01, making a grand total estimated cost of all improvements included in plans and specifications approved last night of \$505,606.30. Sewer work estimates are divided as to total cost as follows: Sanitary, \$47,249.25; interceptors, \$14,961.35; storm water, \$169,859.41.

Little Falls, Minn.—All bids for road graders were rejected by Council Jan. 3 and bids will be readvertised later. A Minneapolis firm, Stockland Road Machinery Co., offered a grader for \$565, or for \$665 with the quick lift attachment, main feature of machine. Only other bid was that made by Austin Western Co. for machine which is now in city. The regular price is \$750, but it was offered for \$600. Another \$750 machine was represented, but no bid put in. City's advertisement called for a "No. 10" grader, a name peculiar to Austin Western and therefore no other could be accepted.

St. Paul, Minn.—Program for road improvements in Ramsey County for coming year was outlined by J. H. Armstrong, county surveyor, at meeting of county board Jan. 3. Seven streets will be graded and improved, two streets will be improved with clay and gravel, and eight streets will be improved with clay and gravel and graded.

Brookhaven, Miss.—Supervisors will ask for bond issue for construction of 120 miles of gravel roads.

Gulfport, Miss.—The \$200,000 worth of bonds issued by Harrison County for roads and bridges was sold Jan. 4 to Hibernia Bank & Trust Co. of New Orleans, at premium of \$1.475, and bank agreeing to furnish blank bonds.

Walkerville, Mont.—See "Sewerage."

Hastings, Neb.—Bids will be received

until 5 p. m., Jan. 24, for purchase of \$50,000 intersection paving bonds.

Reno, Nev.—C. Z. Benadum, a well known business man of Fallon, who is in Reno, is authority for statement that Lincoln Highway Association probably will join with Churchill County in construction of concrete highway, covering about 25 miles of bad road from Hazen to Sand Springs. Benadum is one of Commissioners of Churchill County and an enthusiast for good roads.

Collingswood, N. J.—Mayor is preparing way for authorization by Council of \$75,000 bond issue to cover cost of repairing of Haddon Ave. with granite blocks, grouted with cement and on concrete base.

Ogdensburg, N. J.—Board has approved plans for macadamizing 900 ft. of road east of a culvert along line of Sparta-Ogdensburg Rd.

Albany, N. Y.—Mayor Stevens in his inaugural address recommended extension of North Pearl St. improvements, improvement of north and south approaches to city, extension of Manning Blvd. to connect with new Southern Blvd., and petitions for improvement of streets west of Lark St.

Binghamton, N. Y.—Council will take up matter of paving for 1916 shortly. Two streets to be paved are Beethoven St. and Glenwood Ave.

Herkimer, N. Y.—Clerk and purchasing agent have been directed to advertise for bids to be received at 2 o'clock afternoon of Feb. 1 at office of superintendent of highways for construction of highways under town and county system as follows: Road No. 18, in the town of Warren; No. 26, in the town of Schuyler; No. 11, in the town of Schuyler; No. 27, in the town of Fairfield. The detail sheets of roads furnished by County Superintendent Corey were approved by the Board.

Highland, N. Y.—Resolution has been passed that the next road to be let and built in Sullivan County shall be Barryville-Yulan County Rd., and that highway committee be instructed to use every legitimate endeavor to have this road let at earliest possible date. The matter was referred to highway committee for its immediate action.

Johnson City, N. Y.—Village Board of Trustees Dec. 30 called special election to be held on Jan. 14, to vote upon the proposition of issuing bonds in sum of \$30,000 for purpose of paving portions of Arch St. and Grand Ave.

New York, N. Y.—About 60 Broadway business men held conference Jan. 6 in the office of Borough President Marks and discussed proposal to reneve Broadway between Vesey and 23d Sts. The majority favored asphalt. Some favored granite blocks like those of Lafayette St.

New York, N. Y. (Borough of Brooklyn).—Following bids were received Dec. 30 for repaving with permanent asphalt pavement on 6-in. concrete base Surf Ave. from W. 8th to W. 20th St.: Barber Asphalt Paving Co., \$22,777; Cranford Co., \$25,964; Brooklyn Alcatraz Asphalt Co., \$26,629.

Port Jefferson, L. I., N. Y.—Favorable action was taken on project to build new street from Main St. to Jones St. when application was made to Brookhaven town board yesterday for permission to submit application to town superintendent. Justice Jacob Dreyer laid proposition before board and Attorney George E. Darling, Postmaster Brown, Engineer A. L. Smith and D. C. Squire spoke in favor of project. Street planned will be 50 ft. wide and will pass through middle of what is known as Swamp and Square. Those who spoke in favor of proposition stated that improvement would not cost more than \$2,500 in awards, and would eliminate necessity of investing \$40,000 to \$60,000 in sewage disposal plant which State Board of Health demands unless district is improved.

Ridgeway, N. Y.—Petition signed by residents of Knowlesville has been presented to Board of Supervisors by Supervisor Charles Rorick of the town of Ridgeway, requesting that highway which forms main street of hamlet of Knowlesville be improved as a county highway for a distance of about three miles, commencing at junction with state trunk line highway route No. 30, at the farm of Charles Skinner; about three-fourths of a mile south of Knowlesville, and extending north, through Knowlesville, to Ostrander's Corners, on Ridge Road. The entire distance is in town of Ridgeway.

Schenectady, N. Y.—It was definitely decided Jan. 4 at joint conference of civic affairs committee and committee on state affairs of board of trade with Mayor George R. Lunn and committee representing Common Council to make every effort to secure Erie Canal bed through this city for crosstown streets.

Utica, N. Y.—A petition asking that upper end of 3d Ave. be repaired was sent to City Engineer Joseph Kemper Dec. 30 by residents of New Hartford and Utica who are obliged to use road in question.

Wampsville, N. Y.—Village is planning construction of road commencing about half mile west of village and extending to Canastota.

Greensboro, N. C.—City will sell \$50,000 road bond issue shortly.

Shelby, N. C.—Highway Commissioners of No. 3 township were here Jan. 4 and purchased machinery preparatory to beginning road work in March. A \$30,000 bond issue was recently voted for improved highways and Mr. S. S. Summey of this place has been engaged to superintend work. Petitions are before County Commissioners asking for election in No. 2 township on issuance of \$40,000 worth of bonds, bearing interest not exceeding 6 per cent. for improved highways. Commissioners will go over petitions and if they are efficiently signed, election will be called.

Cincinnati, O.—An ordinance has been passed providing for issue of bonds in sum of \$2,600 for purpose of providing funds to pay cost and expense of condemning property to public use for the widening of Challen St. on east side from Wardall Ave. to southern terminus.

Cincinnati, O.—Council has ordered Selim Ave. from Westwood Ave. to Lionel Ave. to be paved with granite.

Middletown, O.—City Commission has adopted resolutions for paving of Sutpher Ave., Harrison Ave. and McKinley Ave.

Sandusky, O.—County Commissioners are considering proposition of building brick road in Erie County, in improving Milan-Avery pike. This highway is of well-worn macadam and needs improvement. Former District Engineer John Laylin, of Norwalk, who now represents Ohio Paving Brick Co., has informed board that 8-ft. brick pavement can be built alongside rebuilt strip of macadam of equal width as cheaply and to more advantage than any other. Plan is to utilize good macadam now on road. If proposal carries it will be Erie County's first dip into building of brick roads.

Tiffin, O.—Resolution has been approved for improvement of East Perry St. by paving.

Tiffin, O.—A. C. Blosser of State Highway Department was here Jan. 5 to investigate county road conditions. After conference with Commissioners they prepared to ask state for \$12,000 to use on two main market roads and \$17,500 for intercounty highways in this county.

Eugene, Ore.—An ordinance providing for construction of a cement walk in front of lot 3, block 2, Shaw and Patterson's addition, on 12th Ave. east, owned by J. M. Morris, has been passed.

Ambler, Pa.—Town council has selected Feb. 16 as date when voters of that borough will pass upon proposition to issue \$30,000 worth of bonds for highway and municipal betterments, and necessary ordinance has been prepared.

Pottsville, Pa.—Council has approved plans for paving Main St.

Newport, R. I.—At council meeting Jan. 3 Board of Aldermen recommended appropriation of \$10,000 for grading, construction and macadamizing of Washington St. extension.

Woonsocket, R. I.—Resolution has been adopted for appropriation of \$18,000 for street sprinkling in 1916.

Woonsocket, R. I.—Resolution has been adopted for appropriation of \$15,000 for purchasing and setting curbing in 1916.

Bristol, Tenn.—Board has sold \$8,000 road bond issue to Bank of Bristol.

Chattanooga, Tenn.—Resolution pledging Hamilton County to construction of five miles of Dixie highway to connect with Marion County line was adopted at session of County Court Jan. 3. Maximum cost of road, according to Judge Allison, would be \$60,000 but county engineer estimated that it would cost much less than that.

Erwin, Tenn.—The Union County Court Jan. 3, at its regular session, ordered an election for purpose of voting bond issue of \$100,000 for good roads in county.

Maynardville, Tenn.—Union County has just sold issue of \$100,000 of 5 per cent. bonds at par and accrued interest to Chicago banking house. Money will be used in construction of roads and the erection of two bridges.

Bryan, Tex.—County Judge J. T. Maloney and Special Counsel J. W. Doremus have returned from Austin, where they carried \$400,000 good roads bonds of Brazos county and had them approved by comptroller and registered with secretary of state.

Dallas, Tex.—At next meeting of the Board, a request that the city lay sidewalks on Zangs Blvd. adjoining Oak Cliff Park will be acted upon.

Dallas, Tex.—City Commissioners Dec. 31 called for bids on paving Young St. between Houston and Akard, and Wood from Houston to Jefferson. Three materials, bitulithic, vibrolithic or wood blocks, are called for in specifications which were adopted. It is plan of the city to pave streets with permanent materials, as they will form a new improved highway to the new Union Depot.

Terrell, Tex.—Arrangements are being made to grade Bridge St. extending from Moore Ave. to Texas Military College. Overhead bridge has been removed from Texas & Pacific crossing on that street and grade crossing made. Large concrete gate arch is to be erected at entrance to college campus, where Bridge St. terminates, and concrete sidewalks constructed to Moore Ave.

Milford, Utah.—State Road Board will shortly be called upon to act on application for designation and construction of state highway from Milford in Beaver County to Parowan in Iron County. At meeting of Milford Business Men's Association committee of five was named to wait on Parowan Commercial Club and to place matter before commissioners of two counties and before State Road Board.

Norfolk, Va.—Many resolutions and ordinances providing for public improvements to value of many thousand dollars will come before common council Jan. 4. They are: Resolution appropriating \$2,726 for sewerage, water curb and gutter on Raleigh Ave., already adopted by board of aldermen. Resolution appropriating \$1,200 for new boiler for the fire engine in Berkley fire station. Resolution to appropriate \$12,500 to provide for improvement of county road from Virginian Railway crossing to city home; disappeared by public improvement and finance committee.

Fairmount, W. Va.—Marion County, Union, Lincoln and Paw Paw districts will pave roads; J. R. Wilson and H. E. Wilhelm, engineers, made preliminary surveys in Union and Lincoln districts, and S. B. Miller and Frank Wilfong are making preliminary surveys in Paw Paw district; each district is authorized to issue \$200,000 to \$500,000 bonds, aggregating \$1,000,000 for three districts. Address county commissioners.

Edmonds, Wash.—Citizens Dec. 29 voted bond issue for county good roads.

Everett, Wash.—City voted \$1,813,800 road bond issue in election Dec. 28. Authorized issue will construct 130 miles of permanent roads, requiring three years to complete. A gravel road from the Pacific highway to Mukilteo to Edmonds is also included. Snohomish County Good Roads Association will obtain election of three advisory committeemen in each of three road districts to co-operate with County Commissioners in selection of materials and other details in expenditure of the money. The next move will be an effort to market bonds.

Spokane, Wash.—Lewiston Highway District has voted bonds to amount of \$150,000 to provide for construction of hard-surface highway from Clearwater River to top of Uniontown hill.

Milwaukee, Wis.—Street improvements which will cost \$1,500,000 were voted by City Council Jan. 3 through adoption of resolutions upon which favorable reports had been submitted by committee on streets and alleys. About two-thirds of pavements planned will be asphalt surfaces. Street repairs in 1916 will cost the city \$143,000.

Racine, Wis.—See "Miscellaneous."

CONTRACTS AWARDED.

Lake Village, Ark.—To J. B. McCrary Co., at about \$32,000, for paving and constructing sewers.

Osceola, Ark.—For constructing 28 miles of concrete road to L. T. Osborn of Arkansas Construction Co., Little Rock, Ark., at \$184,495.

Bakersfield, Cal.—For grading, concrete paving and constructing culverts on Div. 5, Sec. 1-A, Bakersfield-McKittick road, to Brashear-Burns Co., Van Nuys Bldg., Los Angeles, at \$27,914.

Los Angeles, Cal.—To James L. Frazer, at \$19,495, for doing road work of Road Dist. Improvement No. 39. To M. T. Shafer, at \$7,495, for Road Dist. Improvement No. 60.

Pasadena, Cal.—To Andrew Holloway for work on Hillside Terrace at following bid: Paving per sq. ft., 6½ cts.; grading per lin. ft., 75 cts.; curb per lin. ft., 25 cts.; gutter per sq. ft., 12 cts.

Oak Park, Ill.—To American Asphalt Paving Co., Chicago, Ill., for \$2,547 sq. yds. asphalt pavement on Austin Ave. at \$1.82 per sq. yd., total \$6,577.74, and for 9,572 sq. yds. asphaltic concrete pavement on Thomas St. at \$1.40 per sq. yd., total \$20,554.70.

Angola, Ind.—For constructing road to Brooks Construction Co., Fort Wayne, Ind.

Brookville, Ind.—For constructing highway in Blooming Grove Township to T. F. Wilson & Son, at \$12,052.

Elkhart, Ind.—County Commissioners have awarded contracts for improvement of two roads: Main St. extension of Elkhart-Goshen road will be built by Amandus M. Smith, of Elkhart, who bid \$21,960; Harrison Township road, part of scheme to unite Wakarusa and Elkhart will be improved by Foley Construction Co., who bid \$30,580.

Franklin, Ind.—Contract for construction of Cutsinger and Trout Rds., in Pleasant township, Johnson county, has been let to C. W. Folger, of Edinburg, at \$15,860.

Hobart, Ind.—To C. C. Shearer, Hobart, for paving Conrad A. Peterson road. Bids on Bowers road, Eagle Creek Twp., rejected on account of above estimate.

Indianapolis, Ind.—Contract for purchase of five-ton motor truck for use in road building was awarded Dec. 31 by Commissioners James Kervan and Joseph G. Hayes to Kelly-Springfield Co., of Springfield, O. The bid was \$4,600.

Lebanon, Ind.—To C. M. Dale, Lebanon, Ind., for construction of two gravel roads in Eagle, at \$3,640 and at \$7,280. To E. L. McDonald & Son, Lebanon, Ind., for construction of gravel road in Clinton at \$4,435, and gravel road in Marion at \$2,850.

Shelbyville, Ind.—Moberly & Co. secured the contract Jan. 5 before Board of County Commissioners for construction of Midkiff road, half mile long, in Liberty Township, on bid of \$1,698. Will Midkiff was named superintendent of construction and Perry Harris as engineer.

Shelbyville, Ind.—See "Bridges."

Winamac, Ind.—To Ora E. Shafer, Royal Center, Ind., for constructing gravel road at \$5,757. W. E. Munchen-burg is county auditor.

Atlantic City, N. J.—To Edward L. Bader, Atlantic City, for paving of Meadow Boulevard at \$189,431.20.

Herkimer, N. Y.—Following contracts have been awarded: Road No. 9, 2.93 miles from Cook's Corners over Burrell road to Thompson's Corners in town of Manheim to Michael O'Brien of Cortland at \$11,948; Road No. 16, 6.83 miles from Hull's Corners to Norwich at \$38,398.50. E. J. Cunningham's bid of \$33,104 was rejected as being imperfect; Road No. 7, 8.80 miles in the town of Fairfield to Atlanta Construction Co. of Atlanta, N. Y., at \$41,504; No. 21, Newville easterly to Montgomery County line, to Michael O'Brien of Cortland at \$20,814.50; No. 1, Eagle Bay to Big Moose, 8 miles, all in town of Webb, to B. F. S. Co. of Herkimer at \$48,802.75.

Rochester, N. Y.—Streets will be sprinkled and swept with motor-driven machine. At meeting of Board of Contract and Supply Dec. 30 contract for sprinkler was awarded to International Motor Car Co. at \$5,500.

Tuckahoe, N. Y.—For improving California Rd., between Mill Rd. and Highland Ave., to Frank Braaelello, Scarsdale, at \$6,500; between Highland Ave. and Union Corners to Eastchester Contracting Co., Tuckahoe, at \$16,500.

Westfield, N. C.—To C. C. Jordan for constructing roads in Westfield township, at about \$30,000.

Cleveland, O.—For constructing 1

miles pavement to The Lanese Co., Cleveland, O.

Newark, O.—For paving in Washington Court House to E. F. Bolin at \$52,000.

Painesville, O.—To E. A. Freshwater & Sons, Chester, W. Va., at \$12,276, for constructing 5,942 sq. yds. brick paving on concrete foundation. Will require 3,000 cu. yds. grading.

Toledo, O.—To McKinney Bros. for paving Bancroft St. with brick at \$15,599.

Washington Court House, O.—For paving Main St. with brick and Yeoman St. with macadam to George H. Heffner & Son, Celina, O., at \$1.80 per sq. yd.

Maynardville, Tenn.—To Frank Maloney of Knoxville for road construction at \$82,000.

Dallas, Tex.—City of Dallas entered street repair contracting game recently, when Board of Commissioners awarded it contract for resurfacing Elm St. between Crowder and Mill Creek. City's price on the work, submitted through engineering department, was 70 cts. per sq. yd. Texas Bitulithic Co. bid \$1.50 per yd. and Standard Engineering and Construction Co. \$1.33 per yd. At these prices city's work will amount to \$4,360, but maximum was figured at \$4,500 to cover all contingencies. Bitulithic Company's bid figured \$5,721 without maintenance and that of Standard Engineering Company \$7,732.62. Sureties for they are required to replace paving.

El Paso, Tex.—Bid for paving of Prospect Ave. from north line of Upson Ave. to south line of West Blvd. was awarded to El Paso Bitulithic Co.

Salt Lake City, Utah.—On recommendation of Commissioner R. P. Morris, contract for construction of new road around city's proposed reservoir dam in Parley's Canyon was awarded Dec. 29 by city commission to Parrott Bros. The winning bid was \$9,500. Bid of D. B. Brinton was \$5,436.50, but engineer advised commission that at this figure the work would have to be done at a loss and might entail delay. Other bids were as follows: Christensen Construction Co., \$11,647.54; P. J. Moran, \$11,266.90; Wasatch Grading Co., \$10,853.50; Mullins & Palm, \$10,920.50; H. G. Gilkerson, \$10,298.40; Enoch Smith, \$10,107.

Olympia, Wash.—Contracts awarded Dec. 20, 1915, surfacing with gravel 12 miles Sunset Highway Wenatchee northwesterly to S. G. Kinder, Bridgeport, Wash., \$1.42 per cu. yd. in place, total amount \$7,568.60. Four bids received. Grading Inland Empire highway, Pullman, south, 8 1/2 miles, to G. L. Stickler, Davenport, amount \$23,887.30. Elcht bids. Grading Inland Empire highway, Kennewick, west, Kiona to Richland, 11 1/4 miles, to H. L. Wilson Co., Walla Walla, amount \$16,945.85. Seventeen bids. Grading Inland Empire highway, Walla Walla, west, Touchet to Wallula, 9 1/4 miles, to the H. L. Wilson Co., Walla Walla, amount \$22,678.50. Seventeen bids. Grading Inland Empire highway, Rosalia to Oakesdale, 9 miles, to General Construction Co., Spokane, amount \$21,646.45. Seven bids. All unit price contracts and awarded to lowest bidder. W. W. Roy is Street Highway Commissioner.

SEWERAGE

Birmingham, Ala.—Commissioners have adopted improvement ordinance to provide for construction of certain sanitary sewers in East Lake.

Los Angeles, Cal.—Council has ordered construction of sewers in following streets: Florence Ave., between Normandie Ave. and San Pedro St.; Park Drive; Rosewood Ave. and Van Ness Ave.

Los Angeles, Cal.—Council has ordered construction of sewers in Cassell Place, between Sunset Blvd. and Selma Ave., and in Spence St., between Opal St. and Hollenbeck Ave.

Los Angeles, Cal.—Ordinance has been passed ordering construction of sewer in Sunset Blvd., between Normandie Ave. and Winona Blvd.

Los Angeles, Cal.—Council has ordered construction of sewer in Baxter St.

Los Angeles, Cal.—Lacy Manufacturing Co. was lowest bidder for all of steel pipe called for in initial specifications submitted for San Fernando valley irrigation district distributing system. Its figure being \$280,000. Baker Iron Works came next with a bid of \$300,398, and Western Pipe and Steel Co. was third with \$303,271. There were two other bidders. East Jersey Pipe Corporation and Llewellyn Iron Works, but in both these cases the bids covered only part of supplies called for. All bids

were taken under advisement by Board of Supervisors.

San Francisco, Cal.—Responding to a petition from Holly Park Improvement Club for construction of an Islais Creek sewer from Mission St. to bay, City Engineer O'Shaughnessy stated Dec. 31 that club's idea was that this was one of main sewers for which bond issue was voted was incorrect. Neither of city's two bond issues for sewer system provided for Islais Creek sewer, he said, and as its cost would be so large that budget appropriation for it could not be expected, he recommended to Board of Works that steps be taken to have another sewer bond issue submitted to vote of people.

Stockton, Cal.—City council Dec. 28 adopted specifications and passed resolution calling for bids for sewerage on South, First, Second, Third, Fourth, Fifth, Sixth, Seventh, Eighth, Ninth, Linden, Oso, Aurora, Grant, Stanislaus, American, California, Sutter, San Joaquin, Hunter and El Dorado Sts., McKinley and Peralta Aves., East Sutter and West Sutter Sts. City engineer's estimate for the work is \$21,597.01.

Eustis, Fla.—Bids will be received until 12 o'clock noon, Jan. 20, by D. J. Caldwell, Clerk of Board of Bond Trustees, for \$60,000 bond issue to be used for constructing system of sanitary sewerage to amount of \$20,000, and system of storm sewerage and permanent street improvements in paving to amount of \$40,000.

Jacksonville, Fla.—Money is now available for construction of sewers and drains. As soon as engineering department completes working plans for these improvements contractors will be asked to bid upon work. Several months will be required to complete projects which are to be started with \$250,000. On Dec. 1, 1916, the second block of \$250,000 in municipal improvement bonds will be sold. One-half of this money will be used to complete drainage and sewerage systems and other half will be used for street paving. This will give the city a total of \$375,000 for sewers and drains and a similar amount for streets, as abutting property owners have to pay two-thirds of the cost of paving. During next two years public improvements to extent of \$750,000 will be undertaken.

Chicago, Ill.—Sanitary district committee plans to extend the 39th St. sewer and improve drainage system to flow into Bubbly Creek at cost of about \$500,000.

Winnetka, Ill.—Following bids were received Dec. 21 for sanitary sewer in Woodland Ave.: 3,500 lin. ft. 8-in. sewer pipe, including junctions, complete—James I. Craig, Zion City, Ill., \$1—\$3,500; Gerisher & Royer, 1328 West 72d St., Chicago, Ill., \$1—\$3,500; F. E. Kaminski, Watertown, Wis., \$1.16—\$4,060; Vito Graziano, 515 West Oak St., Chicago, Ill., \$1.23—\$4,305; Kenneth Kunz, Chicago, Ill., \$1.45—\$5,075; E. A. Barker, Melrose Park, Ill., \$1.49—\$5,215; 12 brick masonry manholes, 3 ft. in diameter, with 480-in. covers—James I. Craig, Zion City, Ill., \$38—\$456; Gerisher & Royer, 1328 West 72d St., Chicago, Ill., \$40—\$480; F. E. Kaminski, Watertown, Wis., \$35—\$420; Vito Graziano, 515 West Oak St., Chicago, Ill., \$50—\$600; Kenneth Kunz, Chicago, Ill., \$38—\$456; E. A. Barker, Melrose Park, Ill., \$49—\$588; one connection to manhole of San. Dist. sewer—James I. Craig, Zion City, Ill., \$40; Gerisher & Royer, 1328 West 72d St., Chicago, Ill., \$20; F. E. Kaminski, Watertown, Wis., \$40; Vito Graziano, 515 West Oak St., Chicago, Ill., \$94.50; Kenneth Kunz, Chicago, Ill., \$40; E. A. Barker, Melrose Park, Ill., \$50.

Kendallville, Ind.—An adjourned session of city council was held Tuesday evening, and improvement resolution No. 35, authorizing construction of sanitary sewer on the west and south sides of the city was passed. Work will be started early in the spring. Sewer will be over four miles in length and will cost about \$40,000.

Des Moines, Ia.—Plans are being prepared for 32 miles of sewers in two districts at cost of about \$210,000. Bids will be received some time in February. H. Susong is city clerk.

Strawberry Point, Ia.—All bids have been rejected for vitrified sewer pipe. Next letting Jan. 25, 1916. M. Tschirgi & Sons are engineers.

Salina, Kan.—City council contemplates installation of sewer system.

Lexington, Ky.—Lexington Board of Health Dec. 29 unanimously adopted resolutions urging employment of sanitary

engineer of national reputation to prepare working plans and supervise construction of proposed \$300,000 sewage disposal plant, for which bonds were voted at a recent election. Resolutions were referred to the incoming administration.

Springfield, Mass.—Town Engineer, John L. Hyde, in his annual report has recommended construction of several sewers and drains.

Swampscott, Mass.—Board of Selectmen and water and sewer commissioners, sitting as committee on drainage, gave a hearing upon drainage of Phillips Park and adjacent property Jan. 3. The proposition which seemed to be best and which committee will recommend to town at coming annual town meeting was to construct cement culvert along Phillips Park on Humphrey St. for distance of 870 ft., thence through Anawan road and across property of Grabow Co. 1,100 ft. to connect with new cement culvert of Marshall Brook constructed last summer. This culvert will start at end of Pleasant St. culvert constructed last summer. Supplementary to this another drain is contemplated on south side from the junction of Morse property and Phillips Park property to and across the property of Grabow Co., 875 ft. to the Marshall Brook culvert. Cost of entire system will be about \$10,000 or \$11,000.

Waltham, Mass.—Sealed proposals will be received by City Treasurer Harlan W. Cutter until Friday, Jan. 7, at 10 a. m., for purchase of city of Waltham bonds, as follows: Municipal F. loan—Amount of issue, \$10,500; dated Jan. 1, 1916; maturity, serially as follows: \$2,500 Jan. 1, 1917; \$2,000 each year Jan. 1, 1918, to Jan. 1, 1921, both inclusive. Interest 4 per cent. per annum, payable Jan. 1st and July 1st each year; form, registered. Sewer loan—Amount of issue, \$9,415; dated Jan. 1, 1916; maturity, serially as follows: \$2,415 Jan. 1, 1917; \$2,000 each year Jan. 1, 1918, to Jan. 1, 1920, both inclusive; \$1,000 Jan. 1, 1921; interest 4 per cent. per annum, payable Jan. 1st and July 1st, each year; form, registered. Street loan—Amount of issue, \$5,875; dated Jan. 1, 1916; maturity, serially as follows: \$1,575 Jan. 1, 1917; \$1,300 Jan. 1, 1918; \$1,000 each year Jan. 1, 1919, to Jan. 1, 1921, both inclusive; interest 4 per cent. per annum, payable Jan. 1st and July 1st, each year; form, registered. Surface drainage loan—Amount of issue, \$5,500; dated Jan. 1, 1916; maturity, serially as follows: \$1,500 Jan. 1, 1917; \$1,000 each year Jan. 1, 1918, to Jan. 1, 1921, both inclusive; interest 4 per cent. per annum, payable Jan. 1st and July 1st, each year; form, registered. Street paving loan—Amount of issue, \$3,500; dated Jan. 1, 1916; maturity, serially as follows: \$2,500 Jan. 1, 1917; \$2,000 each year Jan. 1, 1918, to Jan. 1, 1919, both inclusive; \$1,000 each year Jan. 1, 1920, to Jan. 1, 1921, both inclusive; interest 4 per cent. per annum, payable Jan. 1st and July 1st, each year; form, registered. Sidewalk loan—Amount of issue, \$5,000; dated Jan. 1, 1916; maturity, serially as follows: \$1,000 each year Jan. 1, 1917, to Jan. 1, 1921, both inclusive; interest 4 per cent. per annum, payable Jan. 1st and July 1st, each year; form, registered. Water loan—Amount of issue, \$13,500; dated Jan. 1, 1916; maturity, serially as follows: \$3,500 Jan. 1, 1917; \$3,000 each year Jan. 1, 1918, to Jan. 1, 1919, both inclusive; \$2,000 each year Jan. 1, 1920, to Jan. 1, 1921, both inclusive; interest 4 per cent. per annum, payable Jan. 1st and July 1st, each year; form, registered. The right is reserved to reject any and all bids.

Detroit, Mich.—If plans now being discussed by officials of Grosse Pointe Farms are carried out, village will build new sewer system to cost approximately \$150,000. Residents are anxious to have system that will dispose of sewerage in some other way than by dumping it into river and polluting water. Tank method of sewerage disposal, known as Imhoff system, is being given serious consideration by Council.

Flint, Mich.—See "Streets and Roads."

Walkerville, Mont.—City will start ambitious improvement program in the spring, which will include not only improvement of sewer system, but grading of streets and probably installation of more street lights. These improvements, however, will be kept within income of city, so that no indebtedness will be incurred.

Lincoln, Neb.—City plans to construct sanitary sewers in Sheridan, Randall Pl., Park, Cherry St. and Sewell Hill to cost about \$5,875.

Bayonne, N. J.—An ordinance has been passed for construction of sewer under easterly sidewalk of Hudson Blvd.

from point about 105 ft. south of West 21st St. northerly to connect with present sewer in West 22d St.

Camden, N. J.—City is planning construction of following sewers or drains in and along Miller St. from Central Ave. to Ferry Ave., and Budd St. from Miller St. to Tioga St.—East State St. from Cooper River to River Ave., and in Pierce Ave. from East State St. to 26th St., 32d and 33d Sts. from Rosedale Ave. to Highland Ave., 34th St. from Highland Ave. to Fremont St., in Fremont St. from 34th to 36th St., in 36th St. from Fremont St. to Federal St., and in Federal St. from West of 32d St. to 42d St., 34th and 35th Sts. from Rosedale Ave. to Highland Ave.

Haddonfield, N. J.—Commissioners are devoting a great deal of time to consideration of change in Haddonfield's sewerage system. Arrangements are being made to try and eliminate pumping station at West Haddonfield. Station is found by Commissioners to be a very heavy expense and at meeting this week Borough Engineers Remington and Vosburg presented plans for sewage which will do away with pumping station. This would mean building of an additional disposal plant in West Haddonfield and the commissioners now have matter under consideration.

Perth Amboy, N. J.—Bids for laying 12-inch vitrified pipe sewer in Compton Ave. from Groom St. to Poor Farm were received and opened Dec. 20. They are as follows: Meagher & Smith, 12-in. vitrified pipe, per lin. ft., 94c.; brick manholes, each \$30; receiving basins, each \$75. Little & Pfeiffer, 12-in. pipe, 1.08; manholes, each \$30; receiving basins, each, \$75. Rohr & Poulsen, 12-in. pipe, 93c.; manholes, each \$31; receiving basins, each \$70. The bids were referred to committee on streets and sewers.

Binghamton, N. Y.—George L. Robinson, consulting engineer and expert in sewage disposal, who has been associated with Commissioner of Public Works John A. Giles in preparation of plans for a sewage disposal system for Binghamton, will arrive in this city next week to take up matter with City Engineer W. Earl Weller. Plans for intercepting sewer system, which is a most important part of improvement, are completed, and Mr. Robinson will go over these with Mr. Weller and arrange for first steps in construction. As soon as Mr. Robinson approves work so far completed matter of providing funds will be taken up with common council and board of estimate.

Carthage, N. Y.—Board is contemplating construction of trunk line sewer.

Freeport, L. I., N. Y.—Public meeting will be held Jan. 26 to vote on installation of sewerage system.

Hochester, N. Y.—See "Miscellaneous."

Salem, O.—Engineer and service director have been instructed to prepare plans for sanitary sewer on West Green St.

Rome, N. Y.—See "Water Supply."

Greensboro, N. C.—City will sell bond issue of \$25,000 shortly for sewerage purposes.

Marion, O.—Ordinances have been passed for construction of sanitary sewers and storm water sewers on Pennsylvania Ave. and on Henry St.

Middletown, O.—Following bids were received Jan. 4 for sewer tile: W. J. Robertson at \$12,090.05; Aron-Simpson Co., at \$12,130.29; C. H. Martin, at \$13,677.43; Bigler Bros., at \$16,782.65, and Frank Davis, at \$14,136.21. John Kunz is Clerk of Commission.

Sandusky, O.—City contemplates construction of third intercepting sewer to cost about \$25,000.

Cushing, Okla.—Sealed bids will be received up to 7.30 p. m., Jan. 27, 1916, for furnishing of material, tools and labor for construction of deep cut main sanitary intercepting sewer for which bonds have been voted in amount of \$30,000 and which have been sold. All work will be paid for in cash. Certified check in amount of \$1,500 required with each bid. Plans and specifications can be procured at the office of the consulting engineers, The Benham Engineering Co., 13th floor, Colcord Bldg., Oklahoma City, Okla., upon the payment of \$5 or can be examined at the office of L. P. Wharton, City Clerk, Cushing Okla.

Muskogee, Okla.—Attorney General Freeling has approved \$350,000 municipal gas bonds voted recently here, together with \$25,000 sewer extension bonds. The bonds will now be advertised and sold.

Tonkawa, Okla.—Residence district of this city will be served with additional sanitary lateral sewers and City Coun-

cil have engaged a company of engineers, Benham Engineering Co., of Oklahoma, to draw plans and specifications and supervise work of construction. No date of letting can be set until the plans have been filed.

Montavilla, Ore. (Sta. Portland).—City Engineer Dater Dec. 27 made final inspection of Willow and East 52d St. branch of East Stark St. sewer system in company with number of property owners of Montavilla district. Sewer is 20,000 ft. long and for a considerable distance is 60 ins. in diameter. It is of concrete construction, the pipe being in sections about 4 ft. long. William Lind is contractor. The final estimate will approximate \$160,000, it is said. This is several thousand dollars in excess of amount named in contract. The increase is the result of some extra work ordered by city engineer during construction. It drains practically all of Montavilla district and East Mount Tabor.

Pennsylvania.—Permits issued by Dept. of Health relative to sewerage were as follows: Barnesboro Borough, lateral sewer extensions; Ben Avon Borough, extension of time in which to discharge untreated sewage into the Ohio River; Birdsboro (Birdsboro Steel Foundry & Machine Co.), preliminary plans for sewage treatment works; Old Forge Borough, lateral sewer extensions; Philadelphia, lateral sewer extensions; Philadelphia, lateral sewer extensions; Throop, lateral sewer extension; Fell Township, Lackawanna County (Carbondale Machine Co.), sanitary sewer system and sewage treatment plant; Hughestown Borough, lateral sewer extensions; Philadelphia, lateral sewer extensions; Fern-dale Borough, lateral sewer extensions; Lykens Borough, lateral sewer extensions; Miners Mills Borough, lateral sewer extensions; West Donegal Township, Lancaster County (Penna. Masonic Homes) sewage treatment plant; Middleburg Borough, refusing sewers until sewage treatment works are constructed; Hanover Township, Lehigh County (Homeo. State Hospital for the Insane), lateral sewer extensions; West Chester Borough, pumping station and district sewers; York City, extension of time to complete outfall sewer and sewage treatment works.

Providence, R. I.—Following resolutions for construction of sewers were passed at Council meeting Jan. 4: Sewer in Ardoene St., and rights of way, from Reservoir Ave. to sewer known as Section 8, about 150 ft. north of the range of Longfellow St., and in Gallatin St., from near Broad St. to Emerson St. Sewer in Hillhurst Ave., from Pocasset Ave. easterly as far as Hillhurst Ave. is now received. Sewer in Hilltop Ave., from point about 100 ft. south of Eaton St. to Smith St., and in 8th St., easterly from the angle east of Summit Ave. to the center line of Sarah St. Sewer in Manning St., from a point about 200 ft. west of Cooke St. to Governor St. Passed in concurrence. Sewer in Charles St., from a point about 370 ft. south of Branch Ave. to present end of sewer near Silver Spring St. Sewer in Charles and Hawkins Sts., from Ledge St. to the West River, and in Hawkins St., from present sewer in Admiral St. to Branch Ave. Sewer in McDonough St., from Huldah St. to the angle east of Atwood St., and in Latham St., from Lena St. to a point about 80 ft. east of Atwood St. Sewer in Channing Ave., from a point about 100 ft. east of Grotto Ave. to Loring Ave.

Woonsocket, R. I.—Ordinance has been passed for construction of sewers in Charles St., Summer St., Burnside Ave., Farm St. and Nalve St., and for appropriation of \$8,460 for construction of same.

Columbia, S. C.—Townsend Scott & Son of Baltimore were highest bidders Dec. 28 for the \$500,000 of water and sewerage bonds, sold by city council, purchase price being \$520,555. Bonds are dated Jan. 1, 1916, and will bear interest at rate of 4 3/4 per cent. Of half million issue, \$300,000 will be expended in water facility extension. The remaining \$200,000 is to be utilized in the laying of sewer mains.

Columbia, S. C.—See "Water Supply."

Cleburne, Tex.—At meeting of City Council Dec. 31 city took over by agreement Cleburne Sewer Co.'s physical property and issued a warrant for \$28,500. Sewer rates were reduced 40 per cent.

Burlington, Vt.—Resolution has been adopted authorizing sewer on Cliff and Summit Sts.

Norfolk, Va.—See "Streets and Roads." **Norfolk, Va.**—Resolution has been adopted to appropriate \$2,726 for sewerage, water, curb and gutter on Raleigh Ave. on condition that property owners pave roadway, at estimate cost of \$1,800.

Racine, Wis.—See "Miscellaneous."

CONTRACTS AWARDED.

Lake Village, Ark.—See "Streets and Roads."

Anaheim, Cal.—For constructing sewer work, to W. E. Eggert & John Eukropina, 1643 5th Ave., Los Angeles, at \$5,090. Includes 3,650 ft. 10-in. vitrified pipe; 3,794 ft. 6-in. pipe; 24 manholes; 114 10x4-in. Ys; 104 8x4-in. Ys; 132 6x4-in. Ys and 6 flush tanks.

Los Angeles, Cal.—To Peter S. Tomich, 311 North Hill St., for constructing sewer in Griffin Ave., at \$11,500.

Bonniers Ferry, Ida.—To Clifton Applegate Co., Spokane, Wash., for constructing sewer system and sewage-disposal plant, at \$23,493.

Lewiston, Idaho.—For constructing sewer system to C. M. Payne, Spokane, Wash., at \$21,807.37.

Melrose Park, Ill.—To T. H. Iglehart, 718 Rookery Bldg., Chicago, at \$27,000, for constructing sewers.

Rock Island, Ill.—For constructing sewer and water mains in Case Park Addition, to T. F. Trenkschuh, at about \$4,300.

Council Bluffs, Ia.—For constructing west end sewer requiring about 7,550 ft. 6-in., 3,445 ft. 8-in., 2,140 lin. ft. 10-in., 2,040 lin. ft. 12-in. and 2,230 lin. ft. 15-in. pipe to E. A. Wickham & Co., Council Bluffs, at 62 cts. per ft. 6-in., 92 cts. 8-in., 96 cts. 10-in., \$1.05 12-in., \$1.25 15-in. Manholes, \$38.50 each; cement, \$10 per cu. yd. and lumber \$37.50 per M. ft.

Hampton, Ia.—To M. McElligott, Evanston, Ill., at \$6,480, for 7,000 ft. of Salt Glaze tile for sewer construction. Extra for rock excavation, \$5 per cu. yd.

Cherryvale, Kan.—For constructing sewers in District No. 2 to Axtel Oldham of Kansas City, Mo., at about \$16,000. Other bidders were: McCoy & Taylor, Fort Scott, Kan., \$16,319; Inter-Mountain Bridge & Construction Co., Kansas City, Mo., \$17,019; O'Neil Contracting Co., Kansas City, Mo., \$17,246.

Baltimore, Md.—To Carrozza Bros., 606 Munsey Bldg., Baltimore, Md., at \$10,126, for constructing Sec. 1 of Waverley trunk sewers.

Westfield, Mass.—To John W. Ramsay, Boston, Mass., for 10,000 ft. 6 to 24-in. sewer pipe, 79.5% off list. Other bidders were: Warren-Miller Co., New Haven, Conn., 79.1% off list; Portland Stone-iron Co., Boston, Mass., 79.0% off list; W. S. Simpson, Boston, Mass., 78.2%, 15 days.

St. Paul, Minn.—John Lind, St. Paul contractor, was announced Jan. 4 as successful bidder on two lateral sewer projects in South St. Paul, getting awards for the laying of pipes on Fourth and Fifth Aves., south of Marie Ave., in Second Ward. Fourth Ave. sewer extending to Fifth St. will be laid at cost of \$4,500 and Fifth Ave. pipes will be run to Third St. at an outlay of \$2,200.

Cincinnati, O.—For constructing Duck Creek interceptor No. 3, to Connelly Construction Co. at \$57,364.

Hackensack, N. J.—For sewers in Passaic and State St., to Standard Construction Co., Main St., Hackensack, at estimated cost of about \$6,257. Lemuel Loezier is city engr.

Syracuse, N. Y.—To John Young at \$8,173.75 for extending Harbor Brook intercepting sewer. Other bidders were: C. T. Hookway Const. Co., \$8,848; Gabriel Bonn, \$11,480.25, and Walsh Const. Co., \$13,857.75.

Painesville, O.—For sewer improvements as follows: Sanford St., 4,930 ft. 12 and 20-in. pipe, to Ohio Engineering Co., Lorain, at \$145 for 12-in. pipe and \$246 for 20-in., \$30 each for 12 manholes, etc., total \$13,097. Other bidders were: Severson & Hughes, \$13,785; Hukari & Watson, \$13,837, and Tony Trifiletti, \$14,148, and also East Main St., about 3,530 ft. 9, 12 and 14-in. pipe sewer, at \$8,918.

Doylestown, Pa.—For sewer system for National Farm School, to Green-Starr Engineering Co., Philadelphia.

Philadelphia, Pa.—For constructing Packer St. sewer, 8 x 12 feet reinforced concrete, 1,688 ft. long, to Cantrell Construction Co., at \$75,000, and for Rock Run sewer extension in 7th St., 2,385 ft. long, to Robert Higgins, at \$76,000.

Philadelphia, Pa.—To D. A. Conan, 1345 Arch St., Philadelphia, for constructing sewer work at foot of Snyder St., at about \$22,000.

Park City, Tenn.—For constructing sewer laterals to J. A. Ahler, at \$7,378.73. Will include 15,568 ft. 6 and 8-in. cast iron and vitrified pipe.

Seattle, Wash.—For West and North 50th St. sewers, to C. W. Colt & Co. at \$48,583.50.

WATER SUPPLY

Cullman, Ala.—Plans are being prepared for laying two miles of 6-in. water mains to cost \$12,000. A. G. Coe is city clerk.

Monticello, Ala.—Water Works Company is discussing installation of an electrically-driven pump at pumping station.

Martinez, Cal.—Martinez Development Board is having report prepared on project of establishing municipal water system and will discuss it at next meeting, which will be called by President C. H. Hayden some time next week. G. W. McNear, owner of present system from which city is obtaining its water, will address commercial organization and tell what he is willing to do in regard to this system. It will be purchased with bonds it is hoped to vote, providing price is reasonable.

Los Angeles, Cal.—Sealed proposals will be received until Jan. 10 by board of supervisors for purchase of \$2,604,000 water works bonds.

Pasadena, Cal.—The exact location for large new reservoir which city is to build in extreme northwest was selected by entire City Commission, which visited the grounds recently. Reservoir, which is to be a "twin" affair, is to stand at Sheldon Ave. well in what is now municipal poppy field. At start only first of "twin" reservoirs will be built. Work upon it will be commenced in near future, for it is desire of water department to give employment to those upon city's roll of workers who would be out of work at this time of year because of slackening of street improvement in winter season.

Pasadena, Cal.—Commissioner Salisbury has been authorized to expend \$1,200 in purchase of a piece of land to be not less than 75 by 125 ft. in size for well site for water department.

Sausalito, Cal.—Directors of Marin Water District have decided to sell a block of \$300,000 worth of water bonds, and sent Attorney George Harlan to Chicago to negotiate deal for entire block with capitalists of that city.

Washington, D. C.—Application for authority to issue \$150,000 of 5 per cent. bonds has been filed with Public Utilities Commission by Georgetown Gas Light Co. It is stated that proceeds from proposed issue will be employed in paying off floating indebtedness of the company and laying of a new supply main into Woodley road region, at estimated cost of \$25,000. J. G. Williams, statistician of Commission, will investigate application of gas company and the board probably will act in matter at an early date.

South Bend, Ind.—Harris Trust and Savings Co., of Chicago, was successful bidder for \$25,000 water works bonds at accrued interest and a premium of \$635. Four Indianapolis concerns bid for bonds. They were: Breed, Elliott & Harrison, \$555 premium; Fletcher American National Bank, \$407; E. M. Campbell & Sons Co., \$373, and Miller & Co., \$210.

Emporia, Kan.—Waterworks bonds were carried at the special election Dec. 28 by majority of 45 votes. Bonds which will be issued will be to amount of \$150,000, and will go toward improvement of Emporia waterworks system, following a plan suggested by special committee of citizens appointed by Emporia Commercial club. Black & Veatch, Kansas City engineers, have made careful investigation of water situation and probably will be in charge of work on water system.

Manchester, Mass.—A special town meeting has been called for Monday evening to see if town will appropriate \$10,000 for repairs and reconstruction at pumping station recently burned, this being amount received for insurance.

Springfield, Mass.—Town Engineer, John L. Hyde, in his annual report has recommended conserving water supply or providing more storage.

Springfield, Mass.—Water Commissioners contemplate installation of new pump at pumping station. An electrically-driven pump is recommended.

Waltham, Mass.—See "Sewerage."

Mt. Morris, Mich.—Citizens will vote on bond issue for installation of water works system.

Plentywood, Mont.—Town will sell \$8,000 water bonds at public auction Feb. 7 at office of Town Clerk.

Bridgeton, N. J.—Water works improvements are being discussed here, including repairs to present reservoir and construction of a new reservoir. Charles Collins, Philadelphia, Pa., is Engineer.

New York, N. Y.—Recommendation of board of water supply that New York City spend approximately \$22,000,000 in extending new Catskill water supply system, which is rapidly nearing completion, to Schoharie watershed, has been endorsed by executive committee of Merchants' Association. This project is now before board of estimate and apportionment, and there will be a hearing on it on Jan. 14. Meanwhile recommendation has met with some opposition because of great expense involved.

Newburgh, N. Y.—Superintendent Stanton has recommended following: That 6-in. main be laid in Poplar St., about 740 ft.; in Oak St., about 850 ft.; in Woodland Ave., 700 ft. All these streets are west of Wisner Ave. and there is at present only a 2-in. wrought or steel supply pipe and no hydrants.

Rochester, N. Y.—Bids will be asked for furnishing detector meters for Water Works Bureau.

Rochester, N. Y.—See "Miscellaneous."

Rome, N. Y.—At meeting of Board Jan. 4 petition for water and sewer main on Balsam St. west of Franklin St. was approved.

Watertown, N. Y.—The Mayor at meeting Jan. 1 discussed two sources of water supply for city recently reported upon by engineers who investigated. Their report showed that one source, the north branch of Sandy creek, could be utilized at cost of \$790,000, and another source, several streams near city, at cost of \$891,000. "I recommend that Common Council during the present year," said he, "submit at special election one or both of above propositions to taxpayers for their consideration and settlement." He urged submission at same time of a proposition for dual water supply, the present system and a new one to supply water for drinking and culinary purposes from Pine Plains.

Greenwich, O.—Plans are being discussed for improvements to water works and electric light plant, including enlarging of the reservoir, repairing spillway, new pump and lowering pumps, and other improvements. Cost estimated at \$15,000. F. Daniels is City Clerk.

Commerce, Okla.—Bonds for construction of a system of water works in amount of \$42,000 carried at special election held on Dec. 30 by large majority. Plans and specifications are being prepared by Benham Engineering Co., Consulting Engineers, Oklahoma City, Okla., and bids for construction work will be called for some time during February, no definite date having been set. The bonds have been sold.

Fairview, Ore.—Voters will be asked to pass on proposition to issue \$12,500 bonds for installation of municipal water works system.

Allentown, Pa.—The budget for water department, finally adopted by City Council, provides for expenditures of \$155,656 and calls for some considerable improvements to department's machinery and property. One important item is that of \$2,500 for equipping of Holly pump with Boyd turbine valves, an equipment which is said to add 10 per cent capacity to pump, a desirable condition for pumping station. Another important item is one of \$13,500 for laying of 12-in. water main on 4th St. from Liberty to Tilghman, thence down Tilghman St. across the Tilghman St. bridge. By this main the entire northeast section of the town will have adequate fire protection that it has long needed. On the program of water department for some years to follow this improvement is replacing of small mains in that section of the city and 6 and 8-in. mains. An appropriation of \$20,000 is provided for construction of a storehouse at Fountain and Maple Sts. This is to be last of a group of buildings on that tract. Tentative plans call for three-story structure to house fireproof structure, on third floor of which the fire alarm system could be located while on second floor would be water department offices, together with chemical laboratory.

Pennsylvania.—Permits issued by Dept. of Health relative to water works were as follows: Black Lick Twp., Cam-

bria County (Nanty-Glo W. Co.), decree additional source of supply. Easton-Lehigh Water Co., pump station, high service reservoir and distributing system. Harrison Twp., Allegheny Co. (Natrona W. Co.), disinfection apparatus. Mahoning Twp., Montour Co. (State Hospital for Insane), improvement to water works. Williamsburg Borough, additional source of supply; drilled well. Windsor Borough, municipal water works system; Coatesville Borough, sand washer for filtration plant.

Pennsylvania.—Permits issued by Dept. of Health relative to water works during Dec., 1915, were as follows: Greene Twp., Franklin County (Fayetteville W. Co.), extensions refused and some method of purification required. Jenner Twp., Somerset County (Consolidation Coal Co.), water works extensions. Waterford Borough, Waterford Water Co. (Chas. Himrod, prop.), additional storage basin. Mahanoy Twp., Schuylkill County (Anthracite W. Co.), temporary additional source of supply. Coatesville Borough, temporary intake and pumping station. Dunbar Twp., Fayette County, extensions to distributing system. Kittanning Borough (Armstrong W. Co.).—Preliminary plans for filter improvements. Carlisle Borough (Carlisle Gas & Water Co.), requiring improvements of filter plant. Hatboro Borough (Hatboro Water Co.), requiring improvements at drilled wells. Mercer Borough (Mercer W. Co.), requiring purification. East Pennsboro Twp., Cumberland County (Dauphin Cons. W. S. Co.), approval of plans of an additional filter equipment. East Pennsboro Twp., Cumberland County (D. S. Seltz & F. C. Sites), installation of water works; drilled well supply. Gordon Borough (Citizens' Water Co. of Gordon), additional source of supply and reservoir. Pine Twp., Indiana County (Pine Twp. W. Co.), water works and additional sources of supply from 4 drilled wells. Butler Borough (Butler W. Co.), disinfection apparatus. Danville Borough, additional filter unit. New Castle (City of New Castle W. Co.), disinfection apparatus. Hawley Borough (Hawley W. Co.), additional reservoir.

Providence, R. I.—Bids for furnishing water valves for public works department were opened recently by Board of Contract and Supply at City Hall. Bidders were the following: Eddy Valve Co., Waterford, N. Y.; Chapman Valve Mfg. Co., Indian Orchard, Mass.; Coffin Valve Co., Boston; Pratt & Cady, Inc., Hartford, Conn. Bids were referred to Commissioner of Public Works Slade for tabulation before an award is made.

Knoxville, Tenn.—Six-inch water main will be installed along Kingston Pike between Cherokee Country Club and Eastern Hospital for the Insane.

Galveston, Tex.—City Commissioner M. E. Shay came before board of county commissioners Jan. 3 with a request from city commissioners that county board permit contractors working on submerged water main of city to erect temporary wharf on retaining wall of county causeway near Virginia Point, from which to handle material to be used in submerged main, work to be done under supervision of county engineer.

Tyler, Tex.—Citizens have voted \$250,000 bond issue for construction of entirely new water works system.

Norfolk, Va.—City is discussing plans for purchase of Norfolk County Water Co.

Seattle, Wash.—City Council has ordered the improvement of Wyoming Ave., from W. Spokane St. to a point opposite the north line of lot 14, block 387, Seattle Tide Lands, by constructing water mains therein of proper dimensions and material, together with all gates, tees, crosses, fire hydrants and other appurtenances necessary for the proper water service and fire protection of said district, and doing such other work as may be necessary in connection therewith.

Seattle, Wash.—City Council has ordered the improvement of 9th Ave., N., from Mercer St. to Westlake Ave., N., all in the city of Seattle, by constructing water mains therein of proper dimensions and material, together with all gates, tees, crosses, fire hydrants and other appurtenances necessary for the proper water service and fire protection of said district, and doing such other work as may be necessary in connection therewith.

Racine, Wis.—Water mains have been ordered laid in 15th St. and Munroe Ave. Matter of ordering water mains in 13th St. was referred to fire and water committee.

CONTRACTS AWARDED.

Citronelle, Ala.—To J. W. Gurley & Co., Mobile, Ala., at \$23,083, for constructing water works and sewers.

Tarpon Springs, Fla.—For pumping station, to Oliver Leman at cost of about \$10,000.

Frankfort, Ill.—For laying water mains in village and newly annexed territory to Chicago Heights Coal Co., Chicago Heights, Ill., at \$10,919.

Wheaton, Ill.—For constructing elevated steel tank, 200,000-gal. capacity, to Memphis Steel Constr. Co., of Pennsylvania, Greensburg, Pa., at \$9,543.

Brookville, Ind.—For furnishing pump to John H. McGowan Co., Cincinnati, O., at \$2,950 for a triple expansion pump with a 200-ft. condenser.

Cedar Rapids, Ia.—To Allis-Chalmers Co., Milwaukee, Wis., for a 7,000,000 gal. high lift pump at \$18,000.

New Orleans, La.—For improving water works system, to Etta Construction Co.

Lee Summit, Mo.—For constructing water works system, at \$44,500. Valves and hydrants to Iowa Valve Co., Oskaloosa, Ia.; motor, to Fairbanks, Morse Co.; steel tank and tower, to Memphis Steel Construction Co., Memphis, Tenn.; triplex pump, to Deming Co., Salem, O.; reservoir, to Johnson Construction Co., and installing piping system to Axtell-Oldham Co., Kansas City Mo.

Lincoln, Neb.—For constructing water mains to include 5,200 ft. 12-in. cast-iron pipe to American Cast Iron Pipe Co., Birmingham, Ala., at about \$8,000.

Lincoln, Neb.—For constructing water works and electric light plant at the County Poor Farm to Kormeyer & Co., Lincoln.

Batavia, N. Y.—For c. i. pipe and specials in connection with water works to U. S. C. I. Pipe & Foundry Co., Burlington, N. J., and for lamps for street lighting to Westinghouse Electric Mfg. Co., Pittsburgh, Pa. Chester & Fleming are Engineers, Pittsburgh, Pa.

Cleveland, O.—By Board of Control to Allis Chalmers Co., Milwaukee, at \$35,000, for dismantling and relocating 3 pumps at Division Ave. pumping station.

Cleveland, O.—For constructing water works system to include 2 miles pipe to the Lanese Co. at \$20,000.

East Youngstown, O.—For constructing water works system, to cost \$165,000, as follows: Excavation, grading and concrete work, at \$13,315; constructing superstructure for pump and filter, at \$16,800; extra earth excavation, extra rock excavation, extra reinforced concrete, etc., at \$2,325; and constructing foundation for storage tank, at \$550, to Willis M. Henderson Construction Co.; furnishing cast iron pipe to Massillon Iron & Steel Co., Massillon, O., at \$36,997; Standpipe and tower to Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa., at \$5,685.

Marshall, Okla.—For constructing system of water and electric light to F. W. Kenney & Co., Oklahoma City, at about \$20,000.

Milwaukee, Ore.—For constructing distribution system of municipal water plant to Gleblsch & Joplin, Portland, Ore., at \$22,542.

Reading, Pa.—Donaldson Iron Co., Emmaus, was lowest bidder for c. i. water pipe at \$6,956.

Providence, R. I.—For making wash and core borings by Board Water Supply to Sprague & Henwood, Inc., Scranton, Pa., at \$10,460. Frank E. Winsor is Chief Engineer of Board.

Galveston, Tex.—By City Commissioners to Isaac Heffron, at \$60,000, for installing a submerged 30-in. cast-iron water main. A. T. Dickey is City Engineer, City Hall.

MISCELLANEOUS

Los Angeles, Cal.—Bids submitted to board of public works for sprinkling contract for next four years show a slight advantage for motor sprinklers, according to city engineer, as motor sprinkler can cover three or four times as much territory as horse or mule-drawn wagon. The council has ordered the bids submitted to it for examination before contract is let by the works board. Bids are as follows: T. D. Donegan proposal—Sprinkling wagon with team and driver, price per wagon per day, \$4.15; motor sprinkler with operator, price per sprinkler per day, \$14.50. Metropolitan Contracting Co. proposal—Sprinkling wagon with team and driver, price per day per wagon, \$5; motor sprinkler with operator, price per sprinkler per day, \$30. Alternate propositions:

If the city will pay for a minimum of 40 teams all of the time, will do the work for \$4.50 per team per day. Tyron & Brain bid—Motor sprinkler with operator, price per sprinkler per day, \$15; furnish five sprinklers 16 hours per day, \$28.50; for each 8-hour day, if work 16 hours per day, \$14.25. Colyear Van & Storage Co. bid—Motor sprinkler with operator, price per sprinkler per day, \$12.91. Moreland Motor Truck Co. bid—Motor sprinkler with operator, price per sprinkler per day, \$18.93; if allowed to operate 16 hours a day, will charge for second eight hours \$17.10.

San Diego, Cal.—Plans for municipal market are being prepared by Manager of Operation Lockwood, who also is considering leases of sites for report to council. Manager Lockwood proposes roofed building with stalls on either side. In center he proposes concrete walk for public. Wagons are to back up to stalls from outside. Several sites have been offered. Rex Clark tenders a site on Ninth St. bounded by I, J and K for a rental of \$5,400 a year. Manager Lockwood expects to make a report to council some time next week. Building he believes can be constructed for \$1,500 to \$2,000.

Washington, D. C.—American consular officer in Venezuela reports that a firm in his district is interested in motor trucks of from 1 to 2 tons capacity, and desires to receive catalogues, prices and discounts. Correspondence may be in English. (No. 19596).

Washington, D. C.—A letter from a business man in Norway states that he has inquiries for seamless steel cylinders, steel tubing for electric conduits, crucibles, white and colored cotton waste, electric automobiles and trucks, complete cable plant, including all machinery for manufacturing electric wires and cables of all kinds; plumbers' supplies, bathtubs, showers and sanitary goods for hotels and residences; and also plating apparatus for plating brass and copper articles, such as chandeliers, etc. (No. 19736).

Fort Wayne, Ind.—Board of Works will consider all bids, plans and specifications and arguments of various companies competing for job of constructing garbage incinerator plant in Fort Wayne and then will ask conference with the Council's special committee on garbage, with a view of deciding on location of the plant. The bids submitted under individual plans and specifications are as follows: H. H. Wagner, Huntington, one bid of \$28,500; Peerless Sanitary Incinerator Co., Huntington, bids from \$5,745 to \$19,695; J. C. Derrough & Co., Hobart, Okla., one bid of \$11,980; W. J. Edwards, Chicago, bids from \$29,000 to \$41,000; Charles F. Walters, East Chicago, one bid of \$12,000; Sparks Crematory Construction Co., Memphis, one bid of \$22,000; Nashville Bridge Co., Nashville, one bid of \$35,000; Lewis & Capron, Chicago, one bid of \$24,986; Morse & Boulger, New York, bids from \$10,000 to \$14,900. There has been no date set for letting of contract, board desiring to wait until all companies may be heard on merits of their various proposals.

Rochester, Ind.—A plan to buy 318-acre Taber farm, between here and Lake Manitou, is receiving attention of Rochester Commercial Club. It is proposed to establish city park and lay out new Fulton County fair grounds. The price asked is said to be \$45,000.

Lawrence, Kans.—Canvass of votes on issuing bonds for draining of North Lawrence swamp was reported as favorable to bond issue at meeting of directors of drainage board Jan. 3 in J. B. Wilson's office and bids on bonds will be advertised for soon. Bonds will be 5 per cent. interest bearing and non-taxable.

Morganfield, Ky.—Bids for construction of Onan ditch, which is 13 miles long and will benefit 20,000 acres, were received and opened by drainage board of commissioners, Dec. 31, when it was found that Collins & Pavey, of Mt. Vernon, Ill., had lowest and best bid. Time limit for construction is one year.

Boston, Mass.—Unless Mayor Curley intervenes, Park and Recreation Dept. will continue plans for erection of convenience station on Common, at a cost of approximately \$12,300.

East Lynn, Mass.—Taxpayers contemplate petition to Council for improved fire and police service.

Holyoke, Mass.—Mayor John J. White in his inaugural address promised improvement and investigation of police and fire signal systems.

Medford, Mass.—Aldermen Jan. 3 vot-

ed \$200,000 for construction of new city hall.

Northampton, Mass.—Mayor Wm. H. Felker in his inaugural address recommended building of new city hall, police station and other civic improvements.

Pittsfield, Mass.—Mayor Geo. W. Faulkner has vetoed order providing for acquisition by city as site for municipal yards the Grounds-Pomeroy property in southern part of city. It is not known definitely what future course will be now.

Waltham, Mass.—See "Sewerage."

West Springfield, Mass.—Chief of police has asked for installation of Gamewell police signal system.

St. Paul, Minn.—An ordinance has been passed appropriating and setting aside sum of \$3,000 from maintenance account of public parks fund, for the purpose of purchasing one auto truck oil sprinkler.

Passaic, N. J.—Commissioners have appropriated sum of \$1,500 for installing force pump and repairing buildings of almshouse.

Roosevelt, N. J.—First National Bank of Roosevelt was awarded bonds for \$18,500 for purchase of land on water front leading from Rahway for purpose of erection of public recreation pier.

Albany, N. Y.—Mayor Stevens in his inaugural address recommended establishment of playground in North Albany.

New York, N. Y.—Bids will be received until Jan. 13 by Commissioner of Street Cleaning, Room 1247, Municipal Bldg., N. Y., for disposal of garbage in Boroughs of Manhattan, Bronx and Brooklyn, for 5 years from Jan. 2, 1917, or for disposal of garbage from boroughs mentioned above on site provided by city for 5 years from Jan. 2, 1917, city to purchase plant on termination of contract at a stipulated price.

Toronto, Ont.—Construction of a publicly owned radial railway in Western Ontario was assured Jan. 3 by passing of by-laws in 14 out of 18 municipalities. Project is one of Sir Adam Beck's Townships of Waterloo, Blanchard, North Easthope and East Zorra voted down proposition. Proposed line will be operated to London, Stratford, Guelph, St. Mary's, Port Credit and intervening territory.

Wilkes-Barre, Pa.—Auction sale of \$15,200 worth of city improvement bonds was held Dec. 29 by Superintendent R. Nelson Bennett of department of accounts and finance.

Sumter, S. C.—Building of new county jail has been discussed and it was decided to authorize legislative delegation to levy one mill extra taxes for next 3 years to provide funds for building of sufficient size for county needs.

Knoxville, Tenn.—A Cadillac roadster, a Buick roadster and a Wesscott roadster, a Kelly road roller, a Lippard-Stuart ambulance and a Kelly patrol wagon will be purchased by city immediately as result of a conference of the city commissioners recently. Commissioners have not as yet decided upon fire truck to be ordered. The American-La France Fire Apparatus Co. is now building an engine which will be sent to this city on trial within next three weeks. If this equipment proves satisfactory it will probably be purchased. No action was taken in the purchase of a garbage wagon. The commissioners are considering advisability of purchasing four Ford chassis and equipping them with beds suitable for street cleaning. These pieces of apparatus will not be ordered until thorough investigation of their practicability has been made.

Dallas, Tex.—Various small improvements to parks in the city have been determined upon by City Park Board as result of an inspection trip to Board's properties. These include coating of sand on athletic field at Summit Park and removal of a small building which city owns there to give more space to playfield. Expenditure of \$750 to put Turtle Creek Parkway in condition for traffic between Maple and Gillespie Aves. has been authorized.

El Paso, Tex.—A petition signed by 25 members of congregation of Temple Mount Sinai was presented Dec. 30 to city council asking council to make provision in annual budget for sum of \$12,000 for continuance of playground movement. Petition states that it would be a step backward not to recognize this need of child to play.

Lubbock, Tex.—Bids for bonds to build new \$100,000 courthouse were opened Dec. 31. Bonds were purchased by Temple State Bank, in which Governor Ferguson is interested.



Why Goodyear Tires?

We could, of course, explain to you here every feature embodied in Goodyear Fire Truck Tires.

But we believe you are more interested in what these tires have actually done in service—not what they are expected to do.

They have for instance, been the tire equipment of 52½ per cent of all the new motor driven fire apparatus manufactured the past year.

When you realize that this is the judgment of Fire Departments and Manufacturers from every section of the country, you can form a very definite idea of the past performance of these tires—and of their quality.

The Goodyear Cushion Fire Truck Tire is designed for the heavy apparatus. The Goodyear Pneumatic Tire for lighter equipment. A booklet, "Getting to the Fire," explains these tires more completely. This we will gladly send you on request.

The Goodyear Tire & Rubber Co.
Akron, Ohio

GOODYEAR
AKRON
FIRE TRUCK TIRES



Janesville, Wis.—Mayor James A. Fathers was authorized by City Council to complete contract with A. A. Russell, automobile agent, for furnishing of police automobile patrol at cost not to exceed \$700 at regular meeting of City Commission held Jan. 4.

Racine, Wis.—Reports have been adopted that deeds of property to city for park purposes from W. G. Gittings and wife and Ward Gittings be accepted.

Racine, Wis.—Street committee reports in favor of following improvements were adopted: retaining wall at garbage plant; overflow sewer at Dean Blvd and Washington Ave.; paving Jones St.; retaining wall on Jackson St.

CONTRACTS AWARDED.

Miami, Fla.—Common Council met Dec. 28. C. J. Grover was awarded garbage contract from Jan. 1, 1916, to Jan. 1, 1917. Grover's bid was \$4,350. R. Smithson was only other bidder. His bid for work of collecting garbage was \$4,900.

Louisville, Ky.—Contracts for digging of ditches in neighborhood of Long View, on River Rd., and St. Matthews, to relieve conditions due to storm water, were awarded by Fiscal Court Jan. 4. Contract at Long View was let to W. F. Woodruff on a bid of \$2,245.40 and one at St. Matthews was let to Hoke Co. for \$2,779.50.

Morganfield, Ky.—Following bids have been received for 13 miles open ditch, 675,000 cu. yds. earth excavation, for drainage system: Collins & Pavey, Mt. Vernon, Ill., at \$36,944; Fred C. Morger, Indianapolis, Ind., at \$47,284; T. Jacobs,

Oaktown Md., at \$48,599; Sternberg Bros., Chicago, Ill., at \$50,927. Contract awarded to Collins & Pavey. N. R. Orcutt is Engineer.

New Orleans, La.—To A. B. Blakemore of this city for excavation of 20,000 cu. yds. earth from ditches along sides proposed road. Road 24 ft. wide, 100 ft. clearing through swamp 2.5 miles length, 20,000 F.B.M. for bridges.

Rome, N. Y.—To Michael J. Bell at \$7,944 for removal of garbage for 5 years.

Utica, N. Y.—To John R. Baxter, Jr. & Co. for collecting city garbage at the meeting of Board of Contract and Supply Jan. 5. Baxter's bid for 4 years and 11 months was \$2,178 per month. Bids were for periods of 11 months, 2 years and 11 months and 4 years and 11 months. This was due to the fact that garbage is being collected this month by William Pritchard as the firm of Becker & O'Neill found it impossible to secure a surety bond after getting 5-year garbage contract a few weeks ago. Bids were as follows: John R. Baxter, Jr. & Co., \$2,418 per month, \$2,257 per month and \$2,178 per month; Fred Green of Cooperstown, \$2,240 for all three periods; Utica Carting Co., \$2,961.66 per month, \$2,508.33 per month and \$2,508.33 per month; William Pritchard (bid in lump sum) for each period, \$2,418 per month for each period; Phelan & Sullivan, \$3,000 per month, \$2,600 per month and \$2,385 per month.

Philadelphia, Pa.—Following are lowest bids opened recently for supplies to city pumping station: Coal storage and handling equipment, Specialty Engineering Co., Trenton and Allegheny Aves., \$14,341; stokers and superheaters, Com-

bustion Engineering Corporation, \$17,950; blowers, B. F. Sturtevant Co., \$1,900; c. i. pipe and special fittings, Standard C. I. Pipe & Foundry Co., Bristol, \$6,427; mechanical stoker equipment, Combustion Engineering Corporation, New York, \$15,864.

Pittsburgh, Pa.—The following contracts for erection of the new City County building have been let by the County Commissioners: Timbrel arches, to R. Gustavino Co., of New York, for \$14,000; cork floors, to David E. Kennedy, Inc., New York, for \$31,271; hollow metal doors, to the Ferritt Iron & Roofing Co., Pittsburgh, for \$8,843, and elevator doors, to W. S. Tyler Co., Pittsburgh, for \$6,302. Total of contracts awarded from time to time is \$2,771,355.26. Original estimate for building, unfinished, was \$3,000,000. This leaves \$228,644.74, now unexpended.

Pottsville, Pa.—New steps contracts were awarded to C. Messersmith for steps from Centre to Second St. at Nichols St. and on North Jackson St., at Arch, and from Peacock St. to Norway Alley near Seventh St., connecting Fishbach and Court House Hill. Following are bids: C. A. Messersmith, Jackson St. steps, \$957; Centre and Nichols, \$1599; Peacock and Seventh St., \$3230. J. Rondell Edwards, Jackson St. steps, \$968.64; Nichols St., \$1,661.03; Peacock St., \$3,298.50. M. A. Mangan, Jackson St., \$1,006.81; Nichols St., \$1,677.11; Peacock, \$3,304.08.

Providence, R. I.—To Wm. M. Harris, Jr., Providence, for bricks at \$9.15 per thousand. W. C. Pelkey is city clerk.

Seattle, Wash.—For court house tunnel, to Jahn Contracting Co. at \$25,005.80.

TOO LATE FOR CLASSIFICATION

BIDS ASKED FOR

STATE	CITY	REC'D UNTIL	NATURE OF WORK	ADDRESS INQUIRIES TO
STREETS AND ROADS				
Kan., Coffeyville	9 a.m., Jan. 17	Constructing sidewalks on several streets (brick)	H. H. Deichler, City Clerk.
Minn., Duluth	Jan. 21	Paving several blocks	W. H. Borgen, City Clerk.
Tenn., Tazewell	11 a.m., Feb. 7	Grading and macadamizing about 30 miles of road	J. H. M. Morrison, Ch. Co. Rd. Coms.
Minn., LeSueur Center	2 p.m., Mar. 6	Five 2 or 4-horse road graders	T. F. Dunn, County Auditor.
SEWERAGE				
Ia., Mason City	2 p.m., Jan. 17	Constructing drainage ditch requiring 18,200 ft. tile	G. S. Frost, County Auditor.
Mich., Saginaw	Jan. 18	Furnishing materials for constructing sewers, water lines and paving	H. E. Eymer, City Engineer.
Minn., St. Paul	10.30 a.m., Jan. 24	Constructing short section of sewer	August Hohenstein, Pur. Agt.
WATER SUPPLY				
Mich., Saginaw	Jan. 18	Furnishing materials for water system	H. E. Eymer, City Engineer.
D. C., Washington	Feb. 5	Hot water piping system in hospital at Portsmouth, N. H.	Bureau of Yards & Docks.
LIGHTING AND POWER				
N. D., Williston	8 p.m., Jan. 24	Constructing electric light system with 217 posts, estimated cost \$25,000	T. F. Craven, Pres. City. Com.
Minn., Alexandria	Jan. 28	Equipment for telephone building and lines	G. L. Treat, Secy., Commercial Club.
W. Va., Wheeling	Feb. 9	Furnishing and erecting lock gates for Dams No. 16 and 17	U. S. Engineer.
FIRE EQUIPMENT.				
O., Barborton	Noon, Jan. 14	Furnishing one chassis	Director of Pub. Safety.
N. Y., New Rochelle	Jan. 18	Furnishing 2 motor pumping engines, 1 city service truck and 1 motor combination chemical and hose wagon	Fire Commissioners.
Neb., Crawford	10 a.m., Jan. 19	Furnishing 600 ft. of 2½-in. hose and ring couplings	C. J. Hornsby, City Clerk.
BRIDGES				
Kan., Hutchinson	Feb. 10	Constructing 2 bridges over Arkansas River	N. B. Harris, County Engr.
MISCELLANEOUS				
Cal., San Francisco	Jan. 17	Constructing two blocks of street railway	M. M. O'Shaughnessy, City Eng.
Mont., St. Ignatius	Feb. 8	4,000 cu. yds. of excavation, 900 sq. yds. of paving, laying 1,300 ft. vitrified pipe and placing 300 cu. yds. reinforced concrete and 35,000 pounds of steel	U. S. Reclamation Service.

STREETS AND ROADS

Phoenix, Ariz.—Having rejected all bids for proposed improvement of road between Tempe and Mesa and deciding that work can be carried out more economically by force account than under contract, Board of Supervisors yesterday directed that first mile from Tempe to the Pacific Creamery be constructed in that manner and that Tarvia specifications be followed in this construction.

Under this arrangement work will be under direct supervision of E. P. Cowdrey, of New York, who is consulting engineer of Barrett Mfg. Co., makers of Tarvia material, although County Engineer Caruthers will direct the force of men engaged in construction.

Goshen, Ind.—Improved highways to cost about \$400,000 are planned in Elkhart County. Contracts will be awarded within a few weeks. The Lincoln high-

way will soon be improved the entire distance through Elkhart County.

Salem, Mass.—Mayor and President of Council were authorized to petition the Legislature for amendment to permit to build or widen Bridge St., to permit resurfacing if preferred; also for authority to issue bonds in excess of debt limit of \$200,000 and to make city engineer a member of water supply commission.



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WE BUILD ALL TYPES

AERIAL TRUCKS
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EUREKA FIRE HOSE

Made of the highest grade fabrics in three or more plies (each ply a hose in itself) and woven in a continuous circular form (not flat). It is exceedingly strong, light and durable.

Eureka Fire Hose Mfg. Co., New York

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Manufacturers of COMPRESSED AIR FIRE WHISTLES,
WHISTLE BLOWERS, BELL STRIKERS,
BOXES, GONGS, Etc., Etc.
ESTIMATES CHEERFULLY GIVEN.

COTTON RUBBER LINED FIRE HOSE

Wax and Para Gum Treated

MILDEW AND ROT PROOF

FABRIC FIRE HOSE MANUFACTURING CO.
Cor. Duane and Church Streets NEW YORK

WHEN YOU WRITE ADVERTISERS YOU WILL
DO THEM AND US A FAVOR BY MENTIONING

MUNICIPAL JOURNAL

The Best Hose in the World

THE OLD RELIABLE
MALTESE CROSS

FOUR-PLY RUBBER

Here's Evidence! Chief Croker says:

HON. NICHOLAS J. HAYES, Fire Commissioner:

Sir: I have the honor to recommend that application be made to the Board of Estimate and Apportionment for permission to purchase, without public letting, 15,000 feet of 2½-inch hose, known as the MALTESE CROSS brand, and 10,000 feet of 2½-inch cotton hose known as the BAKER BRAND. THESE BRANDS OF HOSE HAVE BEEN IN THE DEPARTMENT FOR MANY YEARS AND HAVE ALWAYS PROVEN ENTIRELY SATISFACTORY, and as the winter is about to set in, and as the Department is very much in need of hose, it is necessary that the above amount be purchased with the least possible delay.

Respectfully,

EDWARD F. CROKER, Chief of Department.

New York, September 9, 1904.

FIRE HOSE

Baker Fabric 3 and 4 Ply Solid Woven Rubber Lined Cotton

The Only Cotton Hose that can be made in four equal solid woven plies. Maximum strength, minimum weight.



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126 and 128 Duane Street, New York

301 West Randolph St., Chicago, Ill.
71 Pearl St., Boston, Mass.
34 Fremont St., San Francisco, Cal.
5412 Columbia Ave., Dallas, Tex.

PROPOSALS

Bids will be received until 12 o'clock, noon, January 14th, 1916, at the office of B. A. Wise, City Manager, Charleston, West Virginia, for paving certain streets and alleys in the City of Charleston; consisting of approximately 37,000 square yards.

All classes of material considered.

Information furnished by B. A. Wise, City Manager, or J. M. Clark, City Engineer, Charleston, West Virginia.

NOTICE INVITING PROPOSALS AND BIDS FOR THE RE-PAVING OF STREETS AND THE CONSTRUCTION OF CONCRETE GUTTERS, WITHIN SPECIAL IMPROVEMENT DISTRICT NO. 198, CITY OF BUTTE, STATE OF MONTANA.

Sealed proposals or bids for re-paving the streets and construction of concrete gutters on the streets, within Special Improvement District No. 198, are hereby invited and will be received by the City Council of the City of Butte, State of Montana, at the hour 7:30 o'clock p. m., February 2nd, 1916. Said proposals or bids to be filed with the City Clerk prior to the above mentioned time and to be opened at the regular meeting of the said City Council to be held Wednesday, February 2nd, 1916, at 7:30 o'clock p. m., at the Council Chambers.

Said proposals or bids to be received for the following types and kinds of paving and improvements:

Creosoted Wood Lug Block Paving
Bitulithic Paving

Asphaltic Concrete Paving

Plans, specifications and forms of bids are on file in the office of the Commissioner of Public Works, Butte, Montana, and be had by making a deposit of five (\$5) dollars, which will be refunded on the return of the specifications.

Bids Wanted

San Antonio, Texas.

Proposals are invited for supplying a Road Oiler adapted for applying any kind of oil. Bids are to be opened January 24, 1916.

RAY M. MACKEY,
City Purchasing Agent.

FOR SALE by the City of Blue Island, Illinois. Complete Air Lift Pumping Outfit, Consisting of the Following Equipment:

- 2-75 horse power Westinghouse Motors, Type C. C. L., 3-phase, 440 volts, constant speed, 580 R.P.M., 60-cycle, No. 587472.
- 2-25 horse power Westinghouse Motors, Type C. C. L., 3-phase, 440 volts, constant speed, 850 R.P.M., 60-cycle, No. 637476.
- 2 Ingersoll Rand Motor Driven Air Compressors, type 10, two-stage, 100 lbs. air, 500 C. F. per minute, 16 x 14 and 10 x 14, force feed lubricator on inlet valves.
- 4 transformers 12000 to 440 volts, oil cooled.
- 1-12000 volts Hartman Oil Switch, overload release.
- 2-200 ampere-600 volts, 3-blade fuse switches, quick break.
- 2-100 ampere-600 volts, 3-blade fuse switches, quick break.
- 3-High Tension disconnects on marble bases.
- 1-Heavy double leather belt, 14 inches by 68 feet, endless.
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One "OO" Austin Trenching Machine with ten-foot extension, nearly new. Address J. E. Poin-dexter, Receiver, Fayetteville, Tennessee.

FOR SALE. One forty-five horse-power Knox Tractor, capacity eight tons. Will sell either with the dump wagons or without. This machine has only been used about six months. Address, Henkel & Sullivan, No. 710 Mercantile Library Bldg. Cincinnati, Ohio.

Owosso, Mich.—City is discussing election to vote on road bond issue.

Saginaw, Mich.—City Engineer H. E. Eymmer has been instructed to prepare plans and specifications with cost for paving of Washington Ave.

Butte, Mont.—Council is discussing plans for paving of many streets at cost of from \$60,000 to \$130,000, amount dependent on kind of paving.

Watertown, N. Y.—Plans are being discussed for paving of West Main St.

Ambler, Pa.—Council has selected Feb. 16 as date when voters will pass upon proposition to issue \$30,000 worth of bonds for highway and municipal betterments.

Tacoma, Wash.—Plans for construction of approximately 7.62 miles of new pavement on mountain road and Pacific highway are being drawn by deputy county engineers under direction of County Engr. White. Plans are for new stretch of pavement on mountain road approximately 5.50 miles in length and for an addition to Pacific highway south of Dupont, 2.12 miles long. The two proposed roads will cost in neighborhood of \$100,000, exact cost to be determined by type of pavement used. The state permanent highway fund will be used in paying for both.

CONTRACTS AWARDED.

Columbia Falls, Mont.—To Russell Grader Mfg. Co., Minneapolis, Minn., for road machinery amounting to \$4,145, as follows: 2 Mogul road graders, \$725 each; 4 traction special road graders, \$355 each; 12 road drags, No. 6, \$21.50 each; 6 No. 4 drags, \$18.25 each; 24 No. 1, Buck scrapers, \$21.90 each, etc.

Omaha, Neb.—To Sunderland Machinery Co. for rock crusher for city at \$1,876, and to Sanitary Street Flushing Co., for sewer flusher at \$938.

Portland, Ore.—To Oscar Huber for bitulithic paving of Ainsworth Ave., at \$1.25 per sq. ft., total \$11,108.

Kennewick, Wash.—To H. L. Willson Co., Walla Walla, for grading 11½ miles on Inland Empire highway, Kennewick west, Klona to Richland, at \$16,945.

Pullman, Wash.—To G. L. Strickler, Davenport, Wash., for grading on Inland Empire highway, Pullman south, 8½ miles, at \$23,887.

SEWERAGE

Franklin, Ind.—The \$6,000 bond issue for construction of sanitary sewer extension in this city has been sold to Fletcher American National Bank of Indianapolis on a bid of \$111.

Oakaloosa, Ia.—Plans are being discussed for installation of sewerage system.

North Topeka, Kan.—At meeting Jan. 5 the City Commission instructed city engineer to draw plans and specifications for North Topeka sewer pump. It is estimated that it will take \$1,000 to put pump in such condition that it will

be of value in case of high water this spring.

Lexington, Ky.—Mayor James Rogers and the Commissioners held a conference Jan. 6 with Engineer P. H. Norcross of Atlanta, Ga., of Solomon-Norcross Co., regarding proposed sewage disposal plant which the city will erect. Conference was held right after adjournment of the Commissioner's meeting, and lasted some time. "Decision will not be reached by Commissioners at any immediate date, said Mayor Rogers yesterday, "but other firms are expected to be heard from and other bids received on construction of system."

Shreveport, La.—See "Water Supply." **Detroit, Mich.**—Members of Grosse Pointe village council are discussing plan for installing sewer system at a cost of approximately \$300,000. Plan is to build a tank for disposing of sewage, instead of dumping it into lake. This is second village on banks of Lake St. Clair to take up matter of more adequate and sanitary sewer systems. Officials of Grosse Pointe farms are planning to install similar system to cost nearly \$150,000.

Clyde, N. J.—The advisory board of State Health Department has approved plans for disposal plant to be built by Rockefeller Institute for Medical Research at its establishment near Clyde. Last winter Legislature passed a law permitting vivisection in New Jersey and Rockefeller Institute was established in New Jersey as a result, to carry on this kind of work.

CONTRACTS AWARDED.

Hampton, Ia.—To M. McElligott, Evanston, Ill., for sanitary sewer system, at \$6,480; other bidders were: M. Jenssen, Newall, Ia., \$6,675; Wm. Danforth, St. Paul, Minn., \$7,020; A. C. McNamara, Dubuque, Ia., \$7,210; Dearborn Construction Co., Waterloo, Ia., \$6,717; Anderson & Empe, \$6,745; H. H. Dobson, Lincoln, Neb., \$6,684.

St. Paul, Minn.—To John Lind, St. Paul, for two lateral sewers in South St. Paul, Fourth Ave. sewer extending to Fifth St. at \$4,500 and the Fifth Ave. pipes to Third St. at \$2,200.

Enid, Okla.—To H. A. Hamm for sewer extensions in districts Nos. 60, 61 and 62. W. C. Rogers is City Clk.

Omaha, Neb.—See "Streets & Roads."

WATER SUPPLY

Arma, Kan.—W. C. Moore, consulting engineer of Joplin, has been awarded contract to prepare blue prints of needed water main extensions and authorized to advertise for bids for constructing them. He is to prepare all documents necessary to put matter of these extensions before Utilities Commission and, if permission is granted by Board to make improvement he will oversee construction if city decides to employ him.

McPherson, Kan.—City is discussing plans for installation of a new reservoir as an auxiliary supply.

Plains, Kan.—City has voted bond issue of \$20,000 to pay for installation of new water and light system.

Topeka, Kan.—A. R. Young, city engineer, has been instructed to draw plans and specifications for improvements that are to be made at North Topeka pumping station located at foot of Fairchild St. Mr. Young will commence at once and immediately following completion of that step in the rejuvenation of station, a contract will be let for construction work. Among important changes at station will be installation of heavy brass flood gate to replace one that is now serving at the pumping quarters. A supply of auxiliary parts and new casing for pump are now on hand.

Shreveport, La.—City has sold \$750,000 worth of water and sewer bonds to Hibernia Bank & Trust Co., New Orleans.

CONTRACTS AWARDED.

Valparaiso, Ind.—To M. W. Holben, Gary, Ind., for water works improvements, at \$5,990.

East Youngstown, O.—For machinery and wash tank for new water works, as follows: Triplex pumps and gas engines, to Bruce Macbeth Engine Co., Cleveland, O., \$6,839; steel storage tank to Pittsburgh-Des Moines Steel Co., Pittsburgh, Pa., \$5,685. Valves and hydrants to Ludlow Valve Mfg. Co., \$3,640.40. Chester & Fleming are engineers, Pittsburgh, Pa.